FOUNDRY TRADE JOURNAL

EST. 1902

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VOL. 110
No. 2315

APRIL 20, 1961

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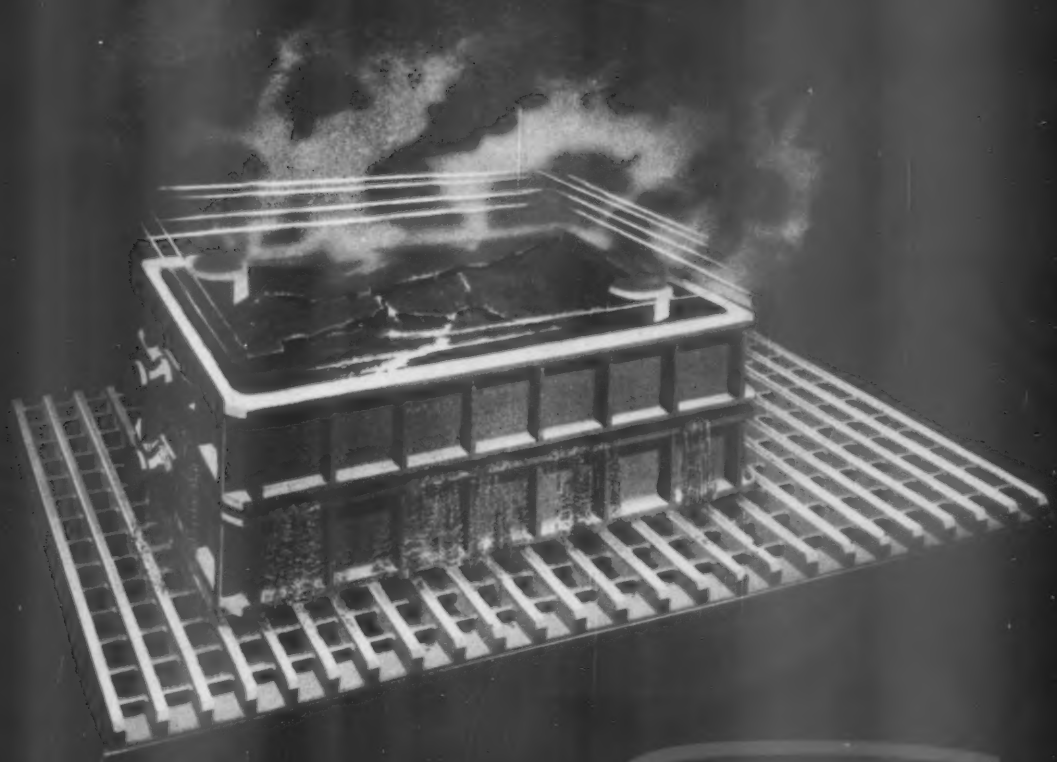

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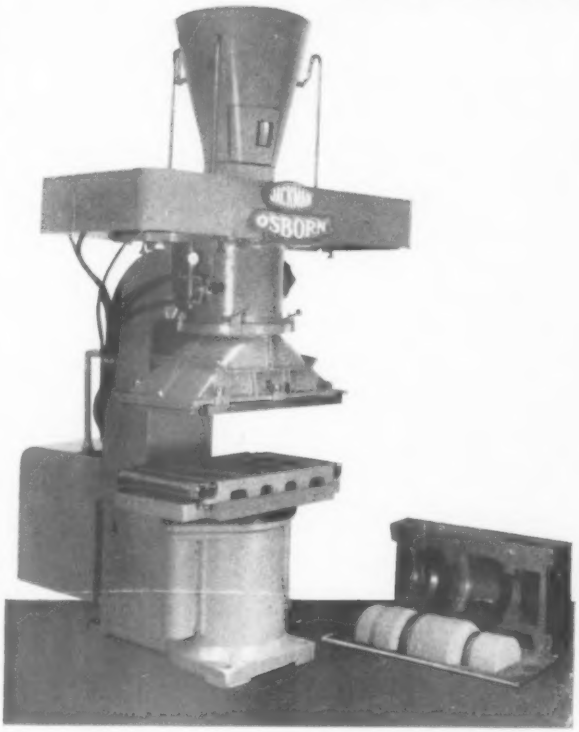

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TABLE HEIGHT RAPIDLY SET AND LOCKED HYDRAULICALLY

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910	25 lbs.	10"
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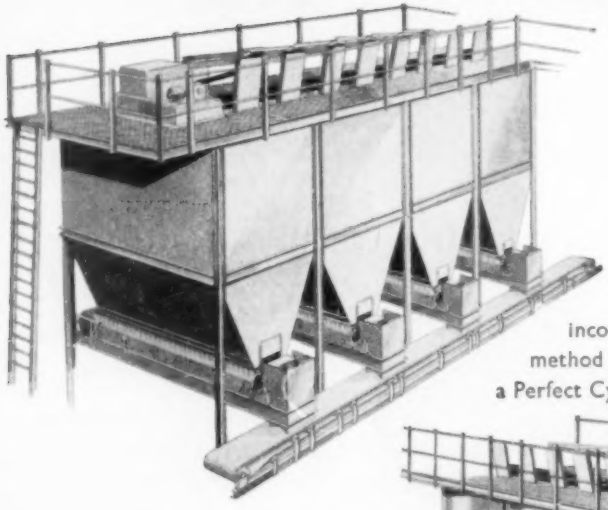
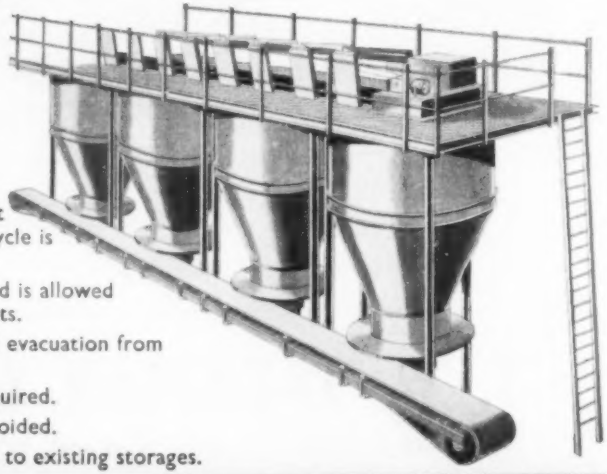


The Mechanised Plants we supply incorporate the ONLY 100 per cent. efficient method of ensuring the use of Returned Sand in a Perfect Cycle.



- No 'Piping' or 'Bridging' inside Hoppers.
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- Sand newly returned from Shake-Out is not allowed to be re-used until cycle is complete.
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- No labour is required to assist sand evacuation from hoppers.
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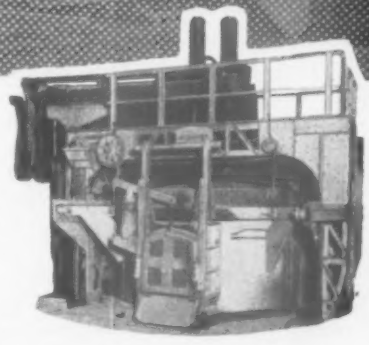

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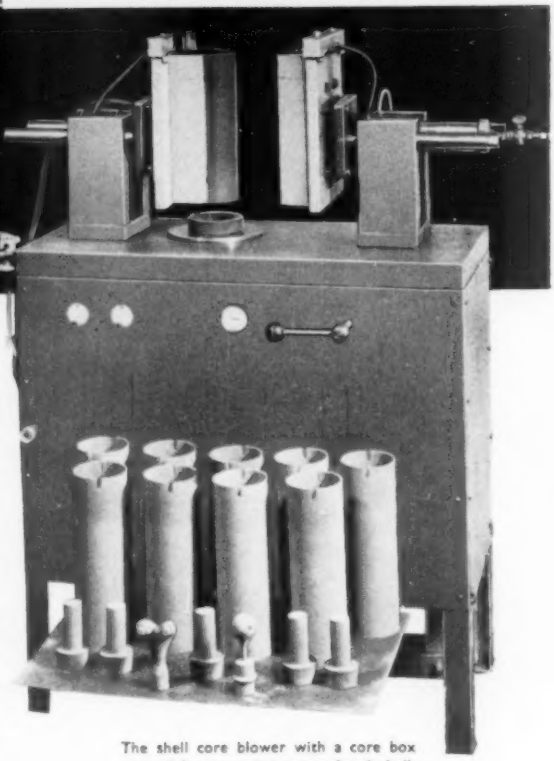
SHELL CORE BLOWER

The Reynolds Shell Core Blower, used with pre-coated resin sands, speeds production of high quality cores and reduces costs. The shells have only a fraction of the weight of solid cores and the saving in material and the elimination of mixing operations, more than offset the higher cost of resin bonded sands. Stronger cores are produced, special vents, supporting wires and driers are not required and the cores are ready for use immediately without further stoving. Storage life is considerably prolonged.



The shell core blower with a core box opened for removing a completed shell. Energy regulators, pressure gauge and control lever are mounted on the front panel. Some specimen cores are shown in front of the machine.

The core blower is of clean modern design, robustly constructed and suitable for use by unskilled operators.

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It grinds ★ sands ★ polishes ★

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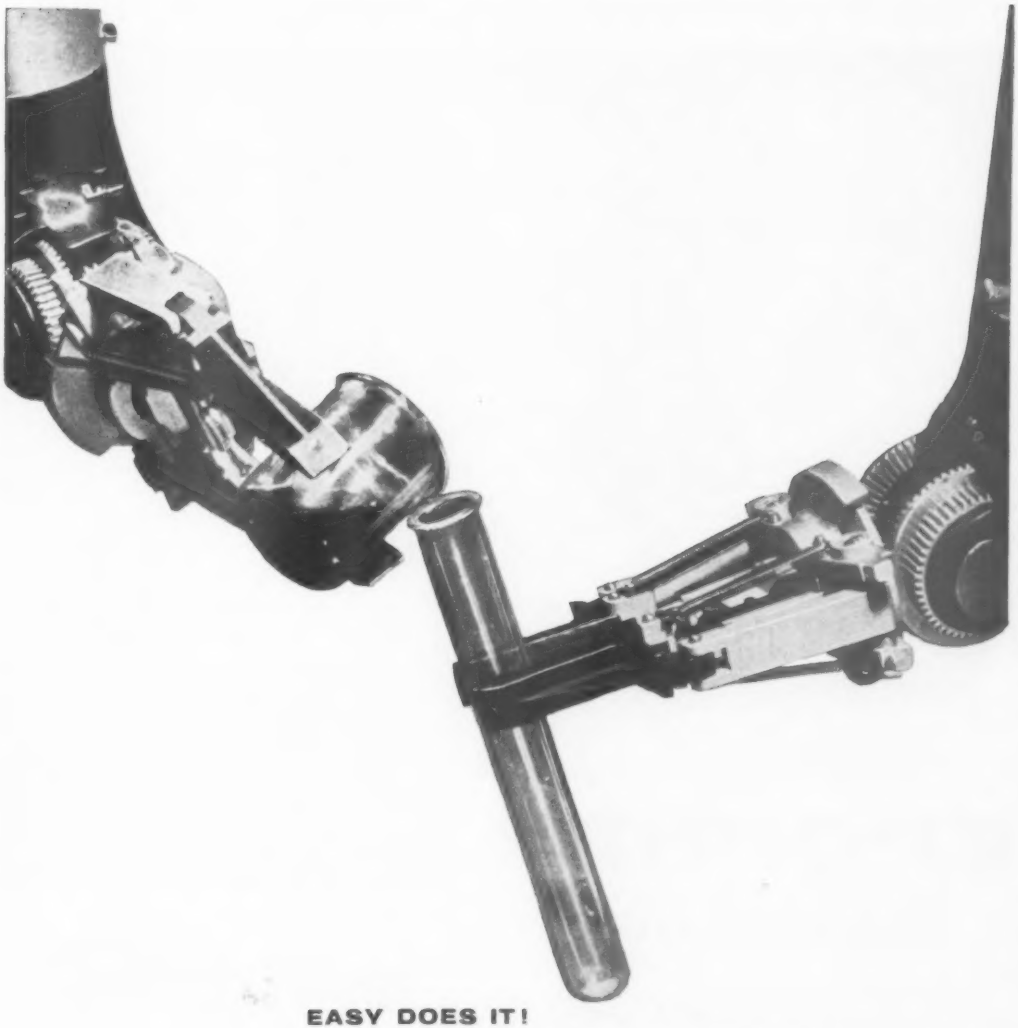

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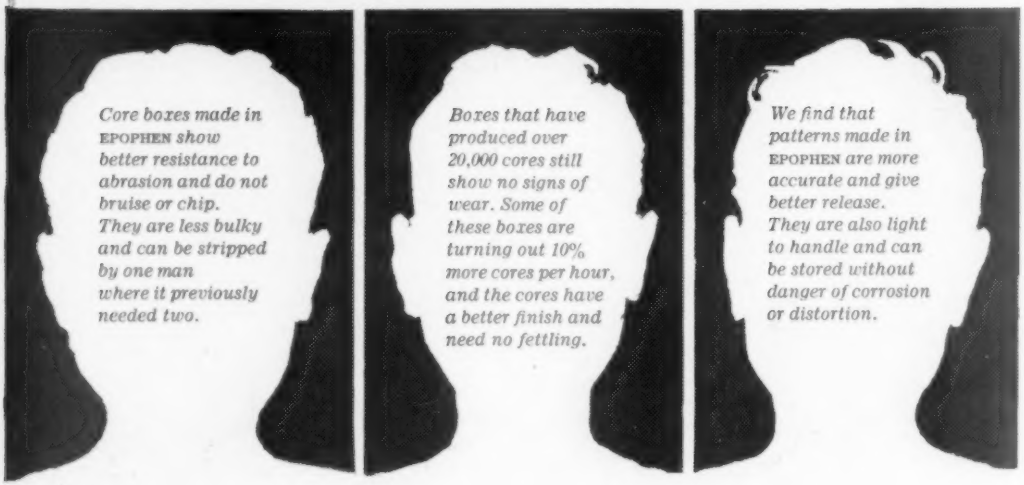
this is what Hepworth & Grandage Ltd think


Core boxes made in EPOPHEN show better resistance to abrasion and do not bruise or chip. They are less bulky and can be stripped by one man where it previously needed two.
Boxes that have produced over 20,000 cores still show no signs of wear. Some of these boxes are turning out 10% more cores per hour, and the cores have a better finish and need no fettling.
We find that patterns made in EPOPHEN are more accurate and give better release. They are also light to handle and can be stored without danger of corrosion or distortion.

T.33

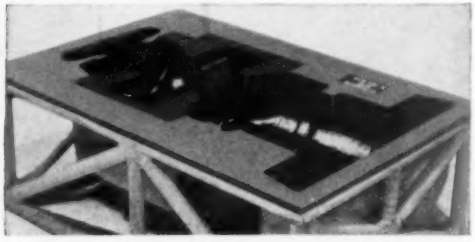
# of Core boxes and patterns made in

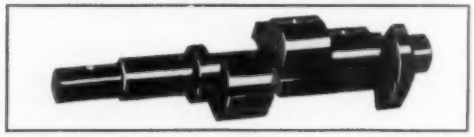
EPOPHEN

Epoxide resin

EPOPHEN compositions also have the inherent advantage of being free from handling hazards in the form of dermatitis and eye-infection. We shall be pleased to send you further details.

This core box has an EPOPHEN *face, backed by four layers of* EPOPHEN*-impregnated glass cloth. The undercarriage is an* EPOTUBE *construction.*





An EPOPHEN *pattern for half a crankshaft measuring 20" long.*

Photographs reproduced by courtesy of Hepworth & Grandage Ltd., manufacturers of the world-famous Hepolite range of motor engine components.

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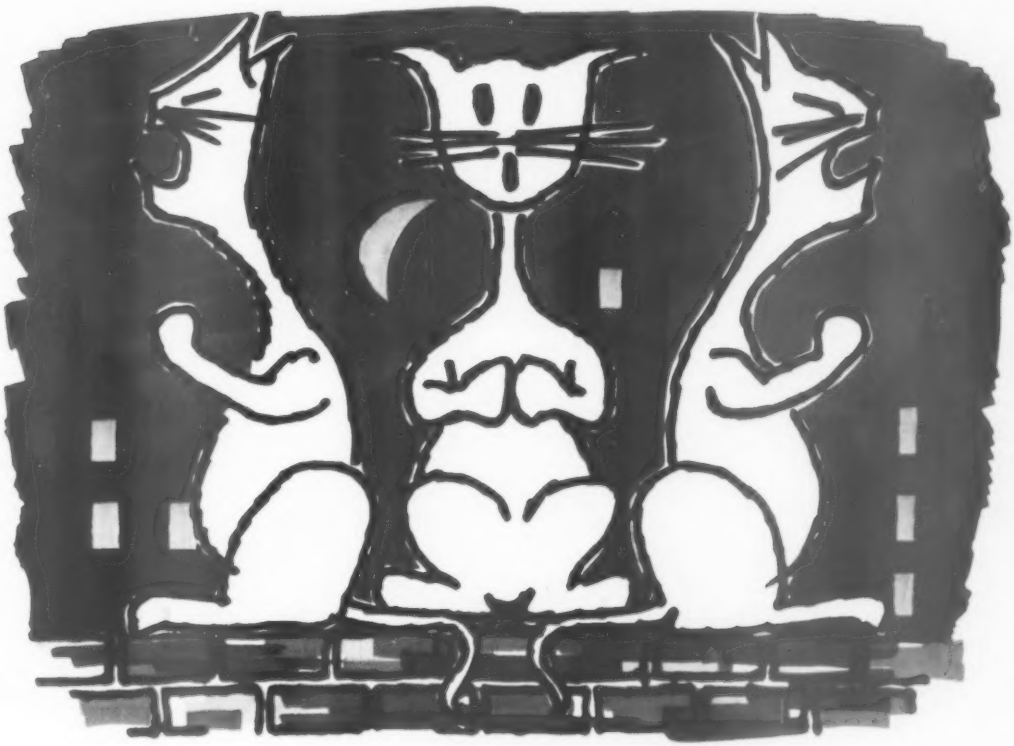
A tale of seven cats...



CATASET

Here's a fine set of Cats!—a range of Air Setting Resin Binders specially bred by Catalin for use for cores and for mould facings backed up with regular moulding sand. With simplified and improved accelerating systems they give a better, cleaner finish and a big reduction in time and fettling. Foundry managers like to have these Cats around—they save them so much money. Why not set them to work for you

SIX MORE CATS FROM CATALIN

CATALAC Flame and Air Set Sprays give a good casting finish and a clean strip. Foundry managers find that this kind of Cat keeps fettling down to a minimum.

CATACORE the specialised quick-baking binder. Here's a Cat that makes a core that makes foundry managers purr with satisfaction because it gives them faster, smoother, cheaper cores.

CATAMOLD is a range of powdered Shell-Moulding Resins. All the Cats in this family produce excellent shell mouldings, without 'peel-back'.

CATABOX This Cat will give you a choice of resins for the Hot Box process. There are Furane type or single stage phenolics. Catabox specialises in speed and quality.

CATAWASH Here's a whole family of Core and Mould Washes, bases and paints. Like all of the Catalin Cats they'll keep your castings really clean.

CATACOTE Better casting is this Cat's business—a cool Cat for the cold pre-coating of sand—for better shells at far less cost than conventional resins.

Catalin's specialised knowledge and years of research into foundry resins and resin conversion can help you in your foundry. Catalin will even breed new Cats to overcome your special problem. Ask a Catalin man to call and give you a Cat Show in your foundry.

Catalin Limited

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CSC1

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8th-12th MAY 1961

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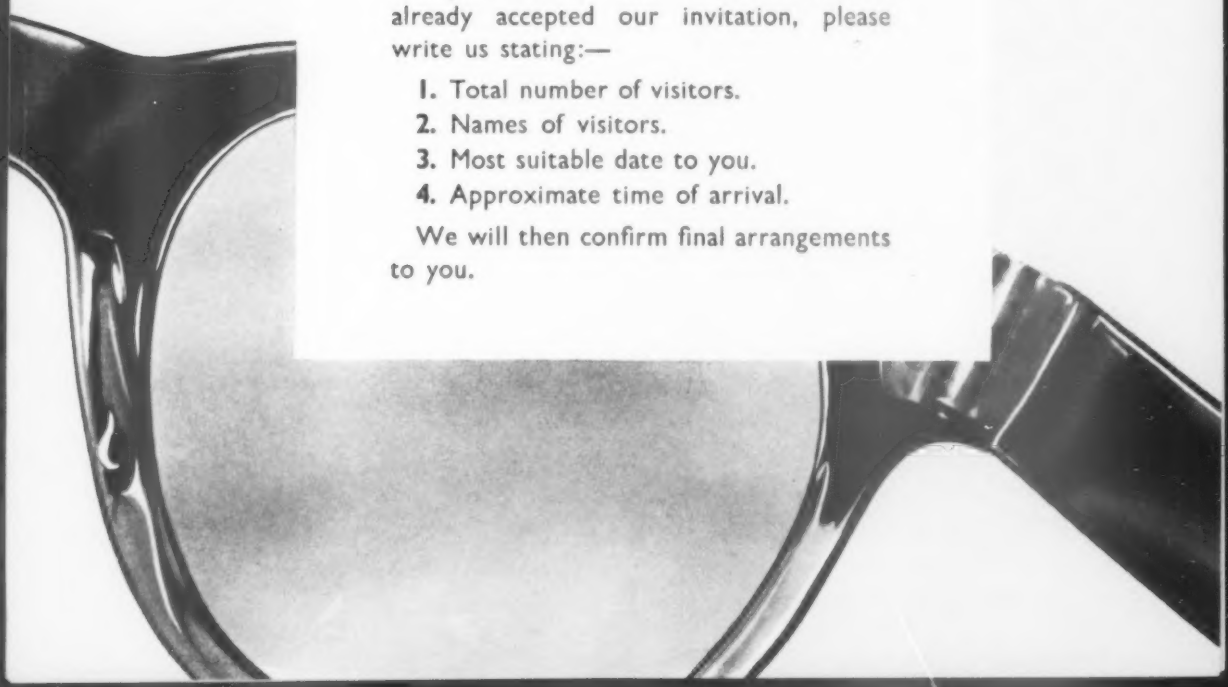
We are pleased to announce another "Open House" from Monday, 8th, to Friday, 12th May, inclusive.

We shall be demonstrating a number of new machines together with modifications to existing models.

If you wish to visit us and have not already accepted our invitation, please write us stating:—

1. Total number of visitors.
2. Names of visitors.
3. Most suitable date to you.
4. Approximate time of arrival.

We will then confirm final arrangements to you.



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"The Air Tumbler"

British Patent No. 629292

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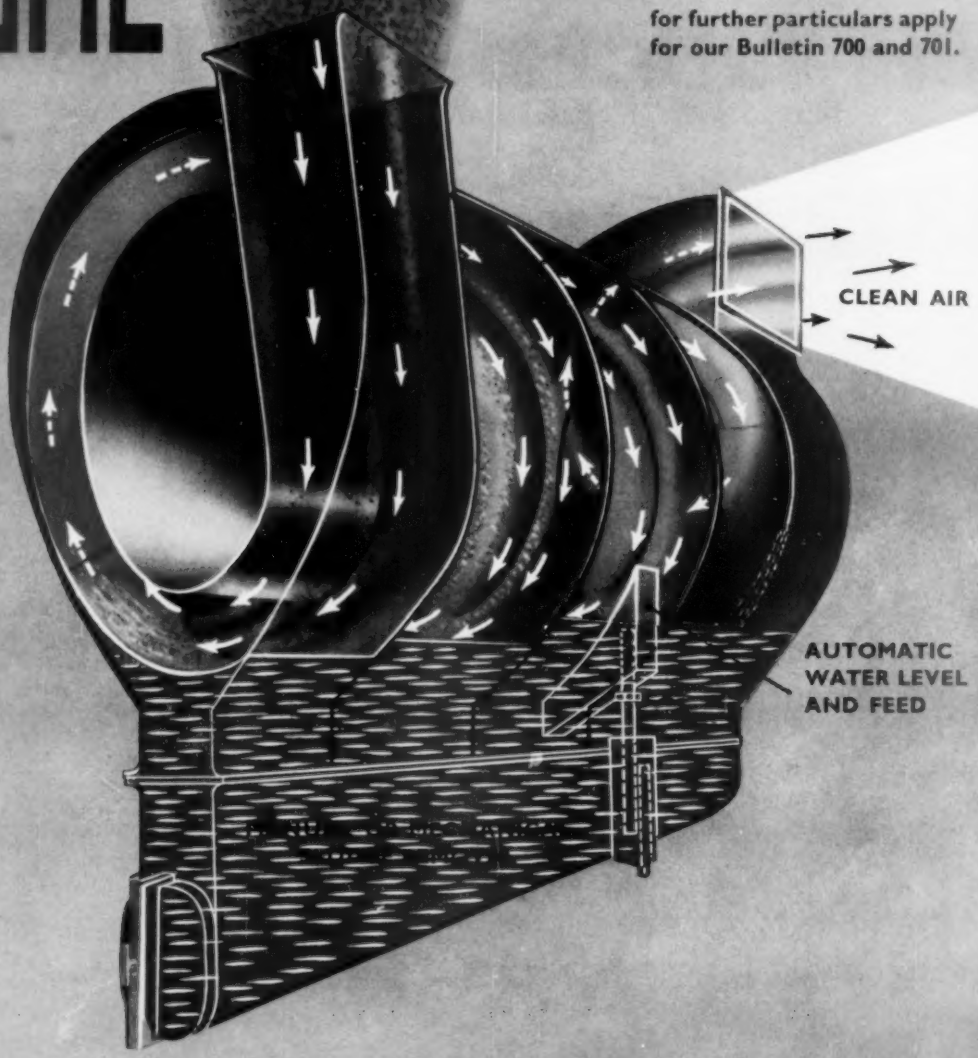
for further particulars apply
for our Bulletin 700 and 701.



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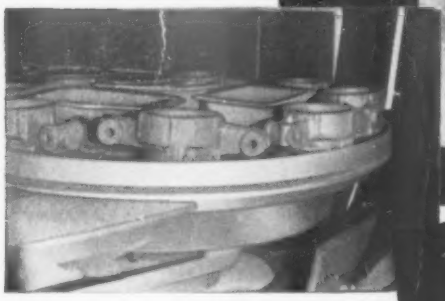
The fastest method of cleaning castings!

AT
TILLING-STEVENS LTD.
MAIDSTONE



These pictures show that Tilling Stevens Ltd., of Maidstone know the most up-to-date and efficient method of removing sand and scale from castings. The components are cast iron suspension unit brackets for armoured fighting vehicles, and are blasted continuously on the rotary table in a 4 minute time cycle. The model shown is WMT4, just one of an extensive range which sets the highest standards yet known in abrasive cleaning. There are Wheelabrator Shot Blast Machines in types and sizes to suit all general applications, in addition to which much special plant has been designed to meet specific requirements.

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110 Hanover Street, EDINBURGH, 2.
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W148

Do you know?

That production costs can be reduced by as much as ⅓ by using CARBORUNDUM's resinoid bonded wheels on floor stand grinders. Take for instance the fettling of these chain links—ideal type of work for this method of grinding.

Our customer's actual operation details are as follows:

COMPONENT GROUND: Chain Links

MATERIAL: White heart malleable iron. 400 Brinell hardness.

MACHINE: High speed floorstand.

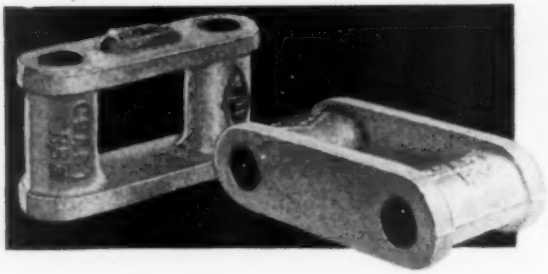
WHEEL GRADING: C16—S3—BC4.

NUMBER GROUND: 12000 links.

GRINDING RATE: 300 per hour.

ABRASIVE COST: 0.096 pence per piece.

These figures mean that since changing to CARBORUNDUM's wheels, an increased production of 33⅓% was possible.



CARBORUNDUM can help you to achieve this kind of production and economy. And not only on snagging and fettling operations. Whatever your grinding process, whatever your problem, we have experts who can advise on the best and most efficient use of abrasive materials.

Write and ask for a representative to call.

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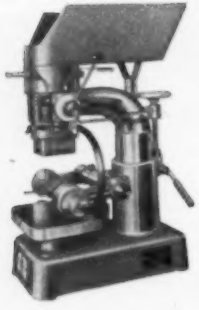

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Minimum venting problems.
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Automatic Oil-pneumatic

Hallsworth Plant doubles casting output at Heeley & Peart..

With your Hallsworth Plant we have doubled production per square foot of floor space and our operators' productivity is now 2½ times as great, with less skill required."

This paragraph from the letter we reproduce shows the phenomenal increase in casting production achieved by the installation of the Hallsworth Automatic Moulding system.

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Rubery Owen Foundry Equipment Division offer a complete advisory service on the building and equipping of the modern foundry, incorporating the Hallsworth Automatic Moulding system and general products of the organisation.

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HEELEY & PEART LIMITED

MALLEABLE IRON FOUNDERS

TELEGRAMS: HOSNAIL, NEWPORT, MON. — Somerton Works, Newport, Mon. — TELEPHONE: NEWPORT 71664/5

7th December, 1960.

A. G. B. Owen Esq., C.B.E.,
Chairman,
Messrs. Rubery, Owen & Co. Ltd.,
P.O. Box 10,
Darlaston,
Staffs.

Dear Mr. Owen,

In this, our Jubilee Year, I feel I must write to say that the recent installation of your Hallsworth Automatic Moulding Plant is one of the best investments we have ever made.

With your Hallsworth plant we have doubled production per square foot of floor space, and our operators' productivity is now 2½ times as great, with less skill required.

As you know, we have ordered a second Hallsworth, and we estimate that with only 30% more floor space we shall produce approximately 3 times as much as before.

We are most pleased with the Hallsworth plant, and with the very efficient service given by your Foundry Equipment Division.

Heeley & Peart Ltd
Newport Foundry
Jubilee
YEAR
1910—1960
Originally founded as Birmingham over 100 years ago

Yours sincerely,

Director.

HEELEY & PEART LIMITED.

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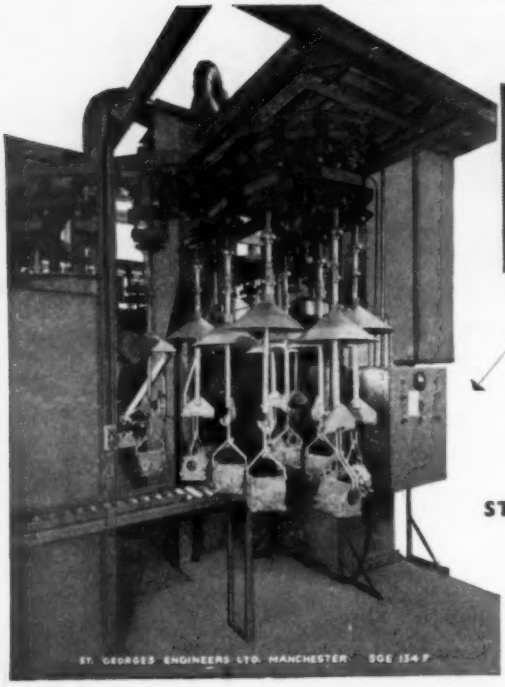
(FOUNDRY EQUIPMENT DIVISION)

EMPRESS WORKS, WALSALL ROAD, WILLENHALL, S. STAFFS. · Telephone: Willenhall 737



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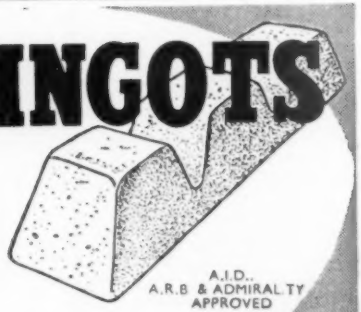

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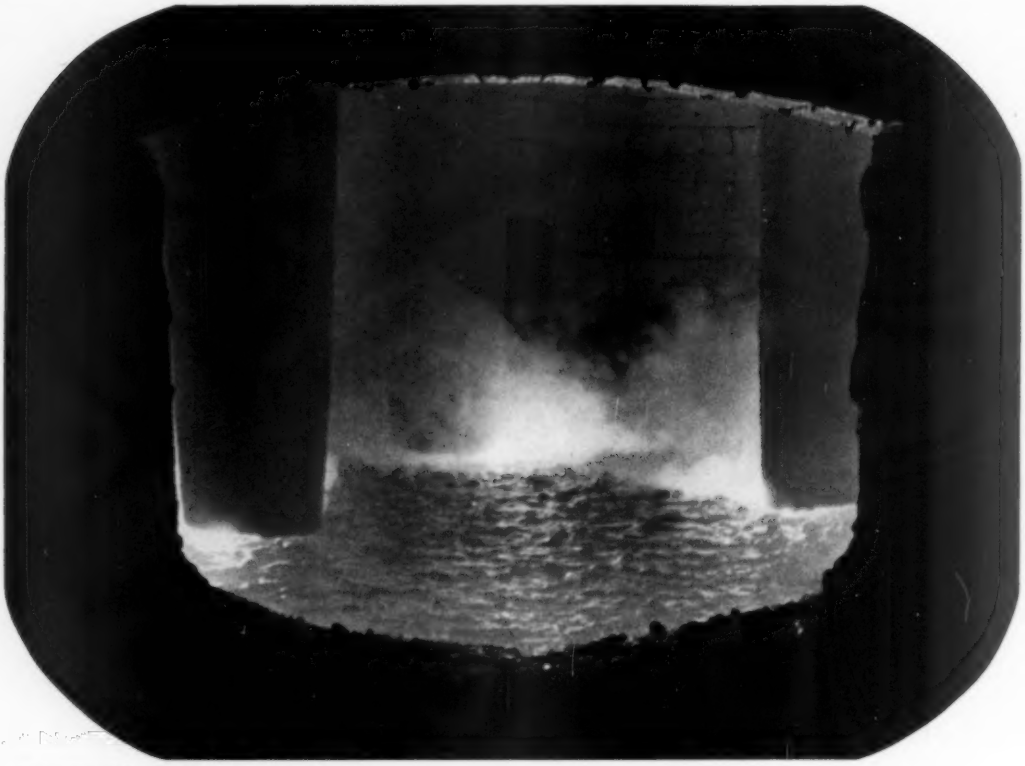

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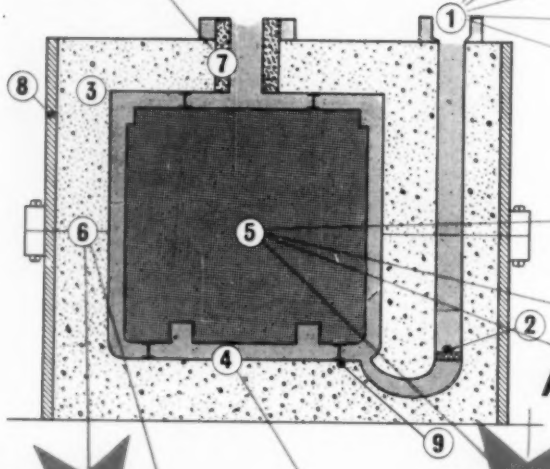

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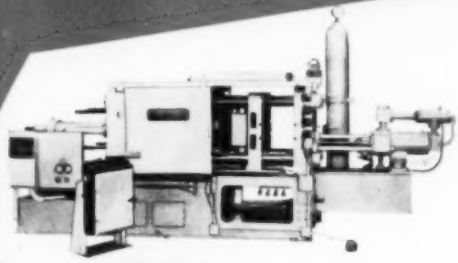

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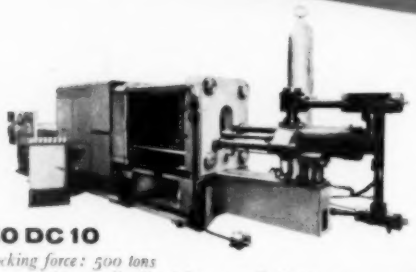

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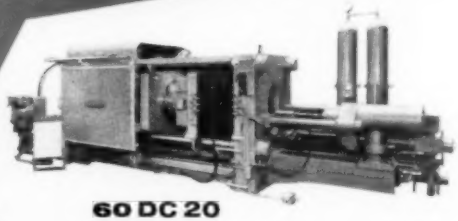

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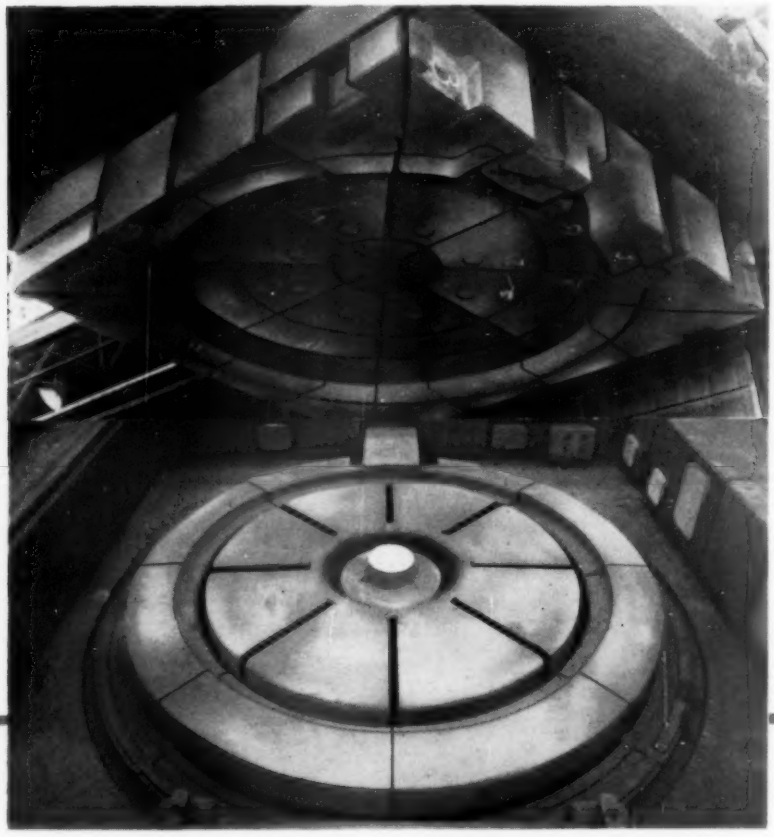

These two photographs show the top and bottom parts of the mould before they are closed.

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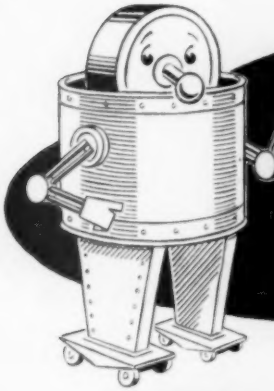

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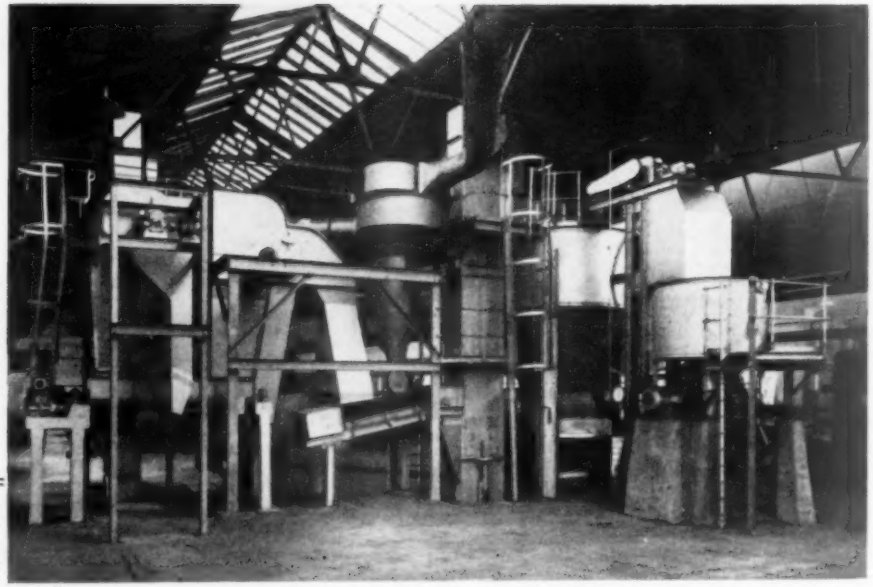

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The Present and the Past

The general Press occasionally pays a tribute to the iron casting which should not be allowed to pass unnoticed. Commenting recently on kitchenware—and especially ovenware more distinguished for fashionable colours than effectiveness, for glamour than long service and durability—a woman writer in one of the most-respected Sunday papers said " No one I know has ever needed to be persuaded to put on the table an earthenware pot or a cast-iron casserole . . ." making the point that it was not a matter of whether a pot looks glamorous, genteel, dainty on the table, but whether it has done a good job in the oven, and adding that cast iron and earthenware always have and always will serve admirably for this purpose. She went on to praise two of our makers of ware of this kind, concluding with: " This is the great moment for British cast-iron ware because two leading Danish manufacturers are giving up." Although their products pioneered the oven-to-table movement, they are apparently regarded as unduly heavy.

In another field, the West Midlands Gas Consultative Council were recently shown by their chairman a piece of cast-iron pipe, taken from a Wolverhampton street, which he said was 95 years' old. It was remarkably free from corrosion and what had impressed him was the texture of the metal. One member of the party said he was " mesmerized " by it and thought it was a wonderful casting. The soil in which it had been buried a foot below the surface was a mixture of sand and clay. Could any other material show a similar low rate of depreciation?

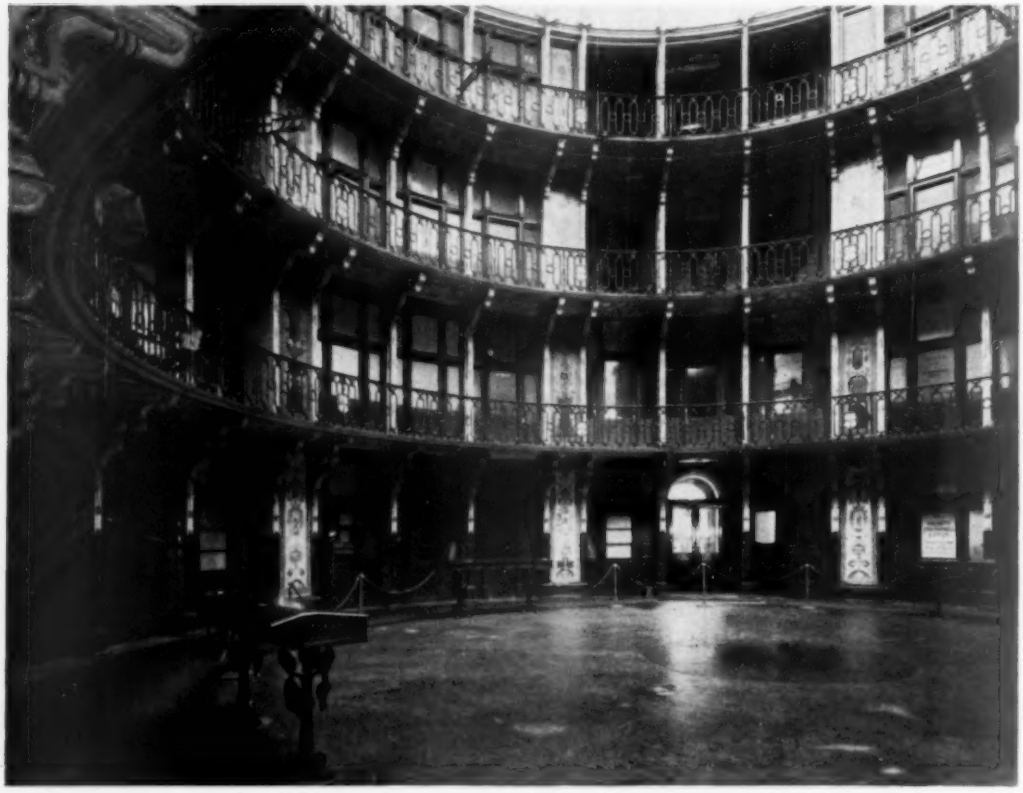
Yet not always are the qualities of cast-iron appreciated, for at this very moment the fate of the Coal Exchange, situated a few hundred yards from the Tower in the City of London, lies in the balance, for it is scheduled for demolition in order to make Lower Thames Street a six-lane thoroughfare. Opened by the Prince Consort in 1849, the Exchange was one of the earliest buildings in the world where cast iron was used not only structurally but architecturally. Beneath the iron-ribbed glass-dome, there are three cast-iron balconies* originally occupied by merchants—but of course not used since nationalization of the coal industry! With a view to its preservation, a committee of six was formed early last month at a meeting of the Victorian Society at Burlington House, to make further approaches to Ministers concerned. If the Exchange can be saved, it has been assumed that road widening would be at the expense of the Customs House opposite, also historic but not unique. The Georgian Society has made it clear that if a choice has to be made, it supports the claim of the Exchange. Among those whose views would be respected and who wish to save the Exchange are Mr. John Betjeman, Professor Nikolaus Pevsner and, not least, Sir Mortimer Wheeler, who thinks it might be used as a National Industrial Museum, as a branch of the Science Museum. He said " . . . this place is a historical document of the first order, a sublime expression of everything Victorian. Cast-iron sentiment," and Mr. John Betjeman said " The Coal Exchange is one of the most amazing pieces of cast-iron construction in the world." Those in the industry who have followed these pioneers will wish success to the Committee of the Victorian Society in its efforts and indeed may desire to find some practical means of giving additional help, since the views of the industry itself would add weight to those whose views rest on an artistic, historical or architectural approach. In the meantime, following questions in Parliament, the City has " reprieved " the Exchange until June.

* See page 490 of this JOURNAL.

Coal Exchange Temporarily Reprieved

As mentioned in the Leading Article this week, London's Coal Exchange, scheduled for demolition because of a street-widening scheme, has been reprieved until June, following representations in Parliament. The photograph shows the galleries of the domed hall of the Exchange, which is one of the most remarkable examples of early cast iron construction in England. Built early in the nineteenth century, it was the forerunner of the Crystal Palace, set up in Hyde Park as the home of the Great Exhibition in 1851.

[*Photo by courtesy of "County Life."*]



Sharing Scientific Equipment

A scheme for sharing scientific equipment between industrial companies in south-east England has recently been announced by the London and South Eastern Region of the Federation of British Industries. It is believed to be the first arrangement of its kind in England and Wales, if not in the United Kingdom.

A large proportion of the 126 industrial firms represented in the region's research directors' discussion group have submitted two lists of items of equipment —one of items they are prepared to make available to other companies: the other of equipment to which they would like to have access. These lists are now being circulated to all members of the group with the suggestion that "offerers" and "seekers" should get in direct contact. It is hoped that other companies will participate as a result of this initial circularization.

Idoson Modernization Plans

The Birmingham Small Arms group has announced that it is to spend £80,000 on modernization and mechanization of the Tindale Foundry of the Idoson Motor Cylinder Company, Limited, to make it one of the most modern in the country. Orders for the necessary machinery have been placed, and it is hoped that the work will be completed in November.

The company's plans are aimed at improving the methods of shell moulding, speeding the production of castings and providing better working conditions—special attention is to be paid to the removal of dust and fumes from the shell-moulding and casting areas. Following present-day trends in the industry, the basis of improved production methods will be mechanization. Alterations have been discussed with the foremen and chargehands, and planning was aided by a scale model of the foundry incorporating the proposed alterations.

Production of Sound Grey-iron Castings . .

. . . Survey of Recent Research

*By I. C. H. Hughes M.Sc., A.I.M.**

Many authoritative articles, and books, have been written on the principles of control of directional solidification and feeding techniques to obtain sound castings in steel and other metals. These principles may be successfully applied to white cast irons, for example, those produced as the first stage of malleable-iron production, and it is not intended to consider either these principles or the production of white irons in this paper. Grey cast iron, on the other hand, is not normally amenable to the use of conventional principles for the production of sound castings, and the work of the British Cast Iron Research Association on soundness over the last 15 years has been principally directed towards understanding the mechanism by which unsoundness occurs in grey irons and developing principles and practices for its elimination. It has proved to be a most fascinating problem and the outcome has been a radically different set of principles for the handling of grey cast iron.

Basically, grey iron is an easy metal to cast sound. It does not solidify with pronounced shrinkage as does steel; instead it solidifies with an expansion which enables complicated shaped castings to be made with excellent definition, very often without any feeding. However, apparent "shrinkage defects" do occur, often unexpectedly. Such defects frequently cause much trouble because, with castings which have normally proved easy to make sound, they occur in epidemics, for which a metallurgical cause is often sought in vain.

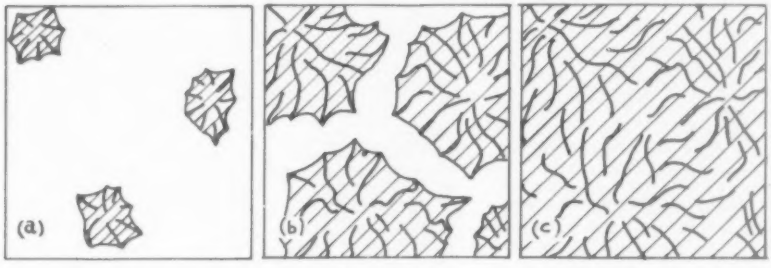


FIG. 1.—*Diagram illustrating successive stages in the growth of the flake-graphite eutectic structure from the liquid.*

Complexity of Problem

Shinkage problems may arise on transferring a pattern from one foundry to another, at particular times of day, in one melt but not in another, or from one type of furnace but not from another. When they do arise theoretical feeding practice often fails where traditional remedies succeed. Sometimes an effective remedy is to change every technical factor possible, but later on it may become necessary to revert to the original conditions to cure the same defects. Only seldom has an outbreak of shrinkage been associated with a major compositional change, and examining the composition or conventional microstructure of castings rarely provides a solution, but founders have often expressed the belief that the quality of the metal may change without measurable change in its composition or temperature. Although it has been known for a long time that dry sand moulds yield the soundest castings, few definite recommendations on optimum moulding conditions have been available.

A particularly puzzling problem has been presented by the shrinkage characteristics of nodular irons. The addition of a very small amount of magnesium, which changes the form, but not the amount, of graphite, causes the metal to require more feeding and to be more prone to exhibit porosity and other shrinkage defects. In order to understand the causes and cure of shrinkage defects in grey iron the BCIRA investigators have worked on a very broad front over the last 15 years or so. It has been necessary to study in detail the mode of solidification of grey iron, the mechanism of spheroidal-graphite formation, the structure of phosphoric irons and the behaviour during solidification of castings and of moulds from the smallest test castings to the largest ingot moulds made in order to provide all the information necessary. This in-

* The Author is on the staff of the British Cast Iron Research Association.

formation has appeared in a variety of progress reports which, by themselves, provide little assistance to the founder and this paper is an attempt to review—and greatly to simplify—the whole problem as it now appears.

Above the eutectic arrest the primary-crystals form.

At the eutectic arrest the eutectic of austenite and graphite solidifies on a spheroidal-crystallization front.

On completion of solidification, the austenite of the dendrites and that of the eutectic becomes continuous.

FIG. 2.—*Diagrams illustrating the solidification of hypo- and hyper-eutectic irons. The left-hand group illustrates hypo-eutectic, and the right, hyper-eutectic phenomena. (Top left) Austenite dendrites in liquid, (b) kish graphite/liquid, (c) austenite dendrites and growing eutectic cells of austenite and graphite, (d) kish graphite and growing eutectic cells of austenite and graphite, (e) and (f) graphite flakes in austenite matrix.*

Solidification Process

A rudimentary knowledge of the solidification process in grey iron is essential for the understanding of its shrinkage problems. Solid grey iron con-

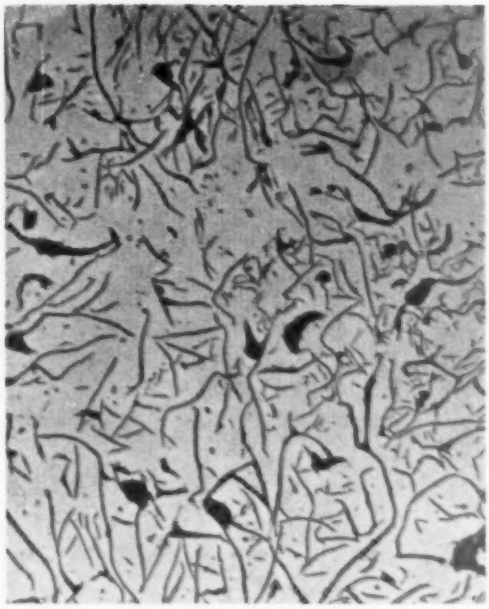
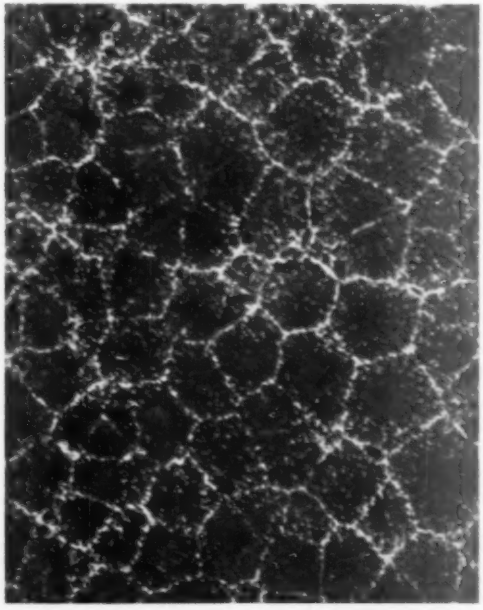


FIG. 3.—*Normal microstructure of flake-graphite cast iron. ×100. Unetched.*

FIG. 4.—*Typical eutectic-cell structure. ×7. Etched in Stead's Reagent.*



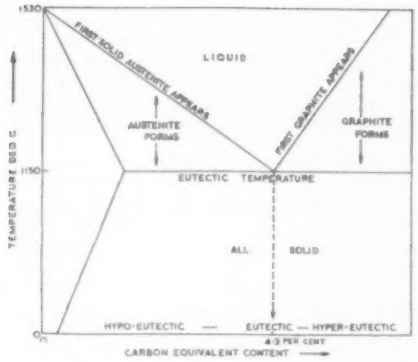
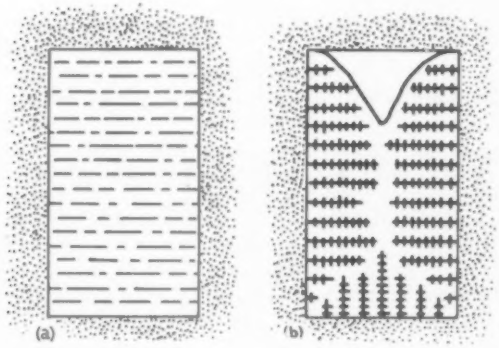
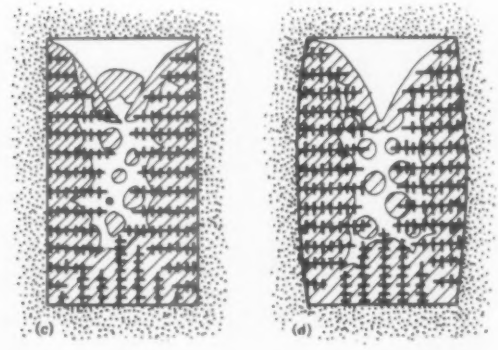


FIG. 5.—*The influence of carbon-equivalent on the solidification of grey cast iron.*



Mould filled with liquid metal. *Dendrite solidification and shrinkage.*



Liquid squeezed out of pipe. *Casting swells.*

FIG. 6.—*Stages of solidification of grey cast iron; eutectic solidifying with accompanying expansion.*

sists of a mixture of flake graphite in a matrix which is generally pearlite or ferrite at room temperature. At the solidification temperature this matrix is austenite, which changes, during cooling, to one or other of the usual structures such as pearlite or ferrite, and these consequently have no bearing on the solidification behaviour. It is the graphite which gives rise to the peculiar solidification properties of grey iron and the formation of this constituent is therefore of particular importance. Most of the graphite occurs by solidification of the eutectic, producing a mixture of graphite and matrix. In the liquid the eutectic begins to grow at numerous points, which may be termed

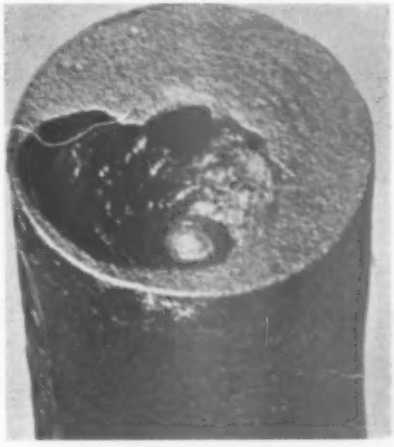


FIG. 7.—*Top of bar casting showing pipe and plug of exuded eutectic-liquid.*

nuclei. The flakes grow in clusters from these nuclei, together with the matrix, and these clusters are termed eutectic cells. The cells grow until they touch one another and have used up all the liquid, in the manner shown in the sketch of Fig. 1. The composition of the eutectic mixture is fixed, and if the iron does not contain the full eutectic amount of carbon (i.e., it is hypo-eutectic) then austenite alone grows first in the form of "fir-tree" skeletons or dendrites until the carbon, which concentrates in the liquid which is left, is sufficient for the eutectic to begin to grow in the way described. Similarly, if the carbon content is greater than that for the eutectic (i.e., it is hyper-eutectic) then graphite is first formed on cooling and this grows as coarse flakes of "kish" until the liquid which remains has lost enough carbon to be of eutectic composition, when the eutectic solidifies normally. Fig. 2 illustrates schematically the solidification of both hypo-eutectic and hyper-eutectic irons.

In considering the soundness of grey iron the number of eutectic cells which grow is of great importance. The normal microstructure, shown in Fig. 3, gives little or no clue to the eutectic-cell

structure, but by rough polishing a cut section, etching suitably, for example in Stead's reagent,* and examining under low magnification, the cell structure may be seen and appears as shown in Fig. 4. Here the cells may be counted and expressed as the number per sq. in., or alternatively, they may be compared with a standard chart and the structure given a fineness number.

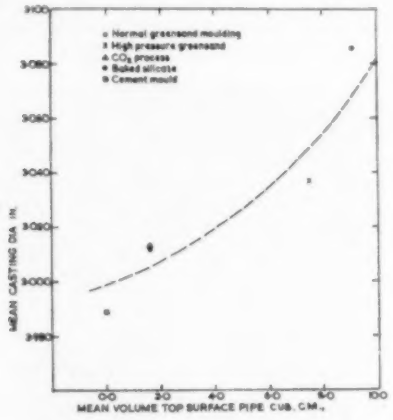

o Normal greensand moulding
x High pressure greensand
Δ CO_2 process
• Baked silicate
o Cement mould
MEAN CASTING DIA. IN.
MEAN VOLUME TOP SURFACE PIPE CUB. CM.

FIG. 8.—*The influence of mould type on size and soundness of spherical test-castings.*

Volume Changes

When graphite forms from the liquid it does so with an expansion. When austenite forms, however, it causes a contraction. The eutectic contains so much graphite that it always, for practical purposes, solidifies with an expansion. Since an expansion during solidification should be beneficial it is desirable to be able to control the iron composition so that it contains as much eutectic as possible. In a pure iron-carbon alloy the eutectic contains 4.3 per cent. of carbon. In cast irons containing silicon and phosphorus the effects of these elements can be allowed for, since they each have an effect on the eutectic composition one-third as great as that of carbon. We may therefore write: Carbon equivalent per cent. = carbon content per cent. + ⅓ (silicon + phosphorus contents) per cent.

The eutectic freezes at a fixed temperature but in irons of other than eutectic composition the formation of primary austenite or graphite occurs over a range of temperature which increases upwards the further away from the eutectic is the composition of the iron. This is illustrated schematically in Fig. 5. Thus not only does the eutectic composition represent greatest solidification expansion but also it has the lowest melting point, which is clearly an advantage in the foundry. Liquid metal shrinks considerably as it cools, and in irons of hyper-eutectic composition the expansion accompanying formation of primary kish graphite is largely offset by the shrinkage of the remaining eutectic liquid.

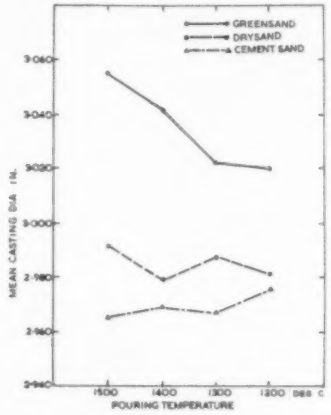
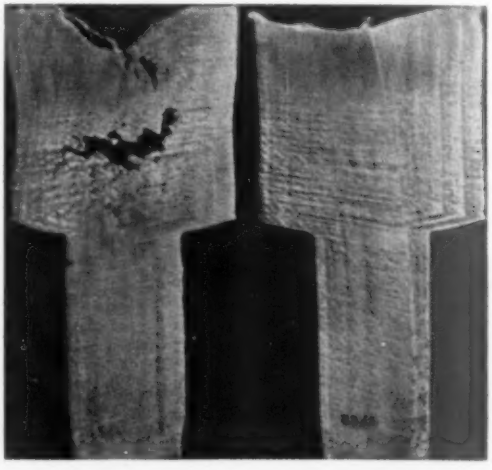


FIG. 9.—*The effect of pouring-temperature on the size and soundness of spherical test castings.*

Although the carbon-equivalent content of the eutectic is fixed at 4.3 per cent., the amount of graphite in the eutectic mixture of graphite and matrix may vary and decreases as the silicon and phosphorus contents increase. Consequently, since graphite provides the expansion which is desirable, a eutectic high in carbon and low in silicon and

FIG. 10.—*Nodular-iron and flake-graphite-iron keel-block castings made in greensand moulds.*



* *Stead's Reagent:* 1. Cupric chloride 10gm. 2. Magnesium chloride 40gm. (both dissolved in minimum quantity of water). 3. Add to ½ litre of alcohol. 4. Add hydrochloric acid, 20 ml. 5. Make up to 1 litre in alcohol.

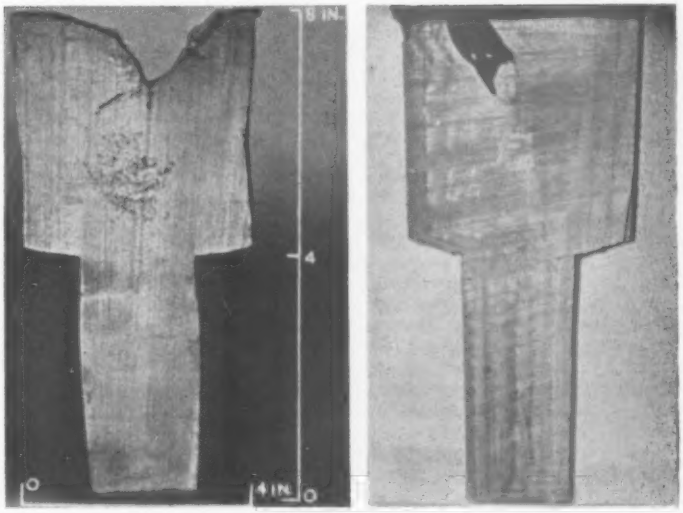


FIG. 11.—*Nodular-iron keel-block castings moulded in green-sand and cement-sand—showing keel swelling and greater internal shrinkage in greensand moulded casting (right).*

phosphorus provides the greatest expansion because it promotes the greatest amount of eutectic graphite.

In fact, the expansion of the eutectic is so great that it ensures that most common irons over quite a range of composition solidify with an overall increase in volume, that is to say, the shrinkage accompanying primary austenite solidification in a mildly hypo-eutectic iron is offset by the subsequent eutectic expansion.

Unsoundness

Why, then, are grey irons sometimes unsound even when of eutectic composition?

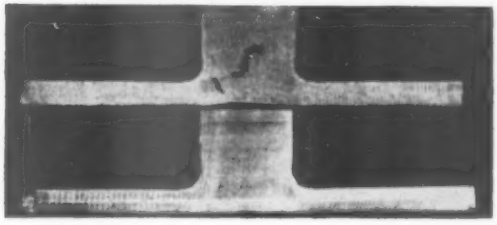


FIG. 12.—*Effect of inoculation in promoting unsoundness. Inoculated and uninoculated test castings of the same final composition.*

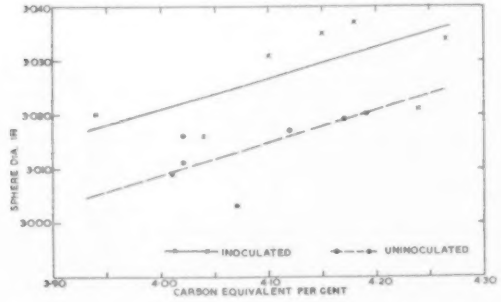


FIG. 13.—*Comparison of sphere diameters; inoculated and uninoculated irons cast at* 1,400 *deg. C.*

The answer is provided by considering the solidification sequence that occurs in a typical slightly hypo-eutectic iron cast in a greensand mould as shown schematically in Fig. 6. Here a simple mould is filled with liquid iron at the temperature near to the beginning of freezing (Fig. 6*a*). First, austenite forms over a range of temperature and the accompanying contraction due to freezing and to shrinkage of the cooling eutectic liquid causes a fall in liquid level, which assumes a characteristic V-shaped pipe because of the progressive crystal growth from the walls (Fig. 6*b*). Now the eutectic freezes and its expansion ensures that the casting is internally sound and causes last liquid to ooze out of the top of the pipe forming a plug of metal of

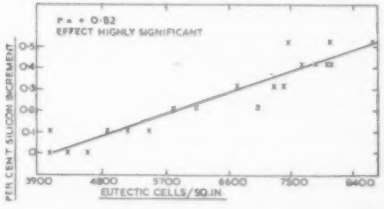


FIG. 14.—*Effect of ferro-silicon inoculation on eutectic-cell number.*

eutectic composition (Fig. 6*c*). This can happen as shown in Fig. 7, which illustrates just such a phenomenon in a grey iron bar. However, in general this does not happen and the true behaviour is shown in Fig. 6*d*. The hydrostatic pressure and heat of the metal cause mould-wall movement and swelling of the casting during solidification so that the volume to be filled by the solidifying eutectic continuously increases. Furthermore, the solidification expansion of the eutectic is transmitted by a mechanism not yet fully understood to the walls of the casting and increases still further the casting expansion to the extent that

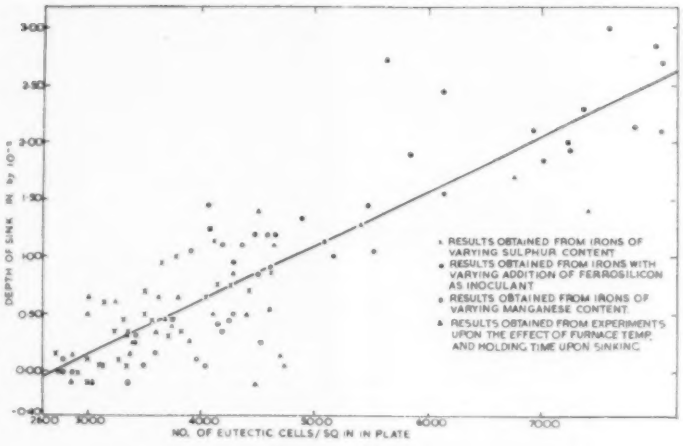

DEPTH OF SINK IN by 10⁻³
NO. OF EUTECTIC CELLS/SQ IN IN PLATE
RESULTS OBTAINED FROM IRONS OF VARYING SULPHUR CONTENT
RESULTS OBTAINED FROM IRONS WITH VARYING ADDITION OF FERROSILICON AS INOCULANT
RESULTS OBTAINED FROM IRONS OF VARYING MANGANESE CONTENT.
RESULTS OBTAINED FROM EXPERIMENTS UPON THE EFFECT OF FURNACE TEMP. AND HOLDING TIME UPON SINKING

FIG. 15.—*Relationship between shrinkage and eutectic-cell number.*

the casting cannot be filled by the solid eutectic, so that an increased pipe is formed and even internal porosity may occur. This is the reason why shrinkage defects occur in grey iron. The process is quite unlike that conventionally thought of for other metals. Some, at least, of the "shrinkage" which appears in Fig. 6*d* could be offset by conventional feeding, but such feeding is not always successful. Feeding here would be strictly to offset not liquid shrinkage but mould-cavity expansion. All the foundry variables which influence soundness do so through their effects upon the process described above and the remainder of this paper is an account of these variables and the way in which advantage may be taken of them to produce sound castings.

Mould Movement

The importance of maintaining dimensional stability of castings in order to achieve soundness is a basic principle. Greensand moulds are not dimensionally stable and under hydrostatic pressure and heat they allow a casting to expand. This expansion continues with time until the casting is solid, and increases with increase in pressure so that the problem is greatest with large castings. Heat plays a part too by increasing mould-wall movement. Pouring temperature is a major factor in determining soundness. Increase in pouring temperature delays solidification, thus allowing greater movement and also promotes greater movement through heating the sand more. In light-section castings the heat imparted by thin parts of the casting is relatively small, but hot spots generally cannot be avoided at changes of section. However, quite-small mould-wall movements can be associated with serious defects, as can be appreciated when it is realized that a spherical hole ¼-in. dia. in a boss on a thin plate 12-in. square can be caused by increasing the thickness of the plate by only one thousandth of an inch. Even in drysand moulds some casting expansion can occur, especially in large castings giving high hydrostatic pressures. In a 140-ton ingot-mould casting increases of up to ½-in. in wall thickness have been measured, associated with several tons of feed metal requirements[1]. Normally, however, hard-rammed moulds give sounder castings than soft-rammed moulds and drysand moulds yield much fewer unsound castings. The influence of mould type is illustrated by Fig. 8. The most rigid sand moulds in use are obtained from cement sand which actually squeeze the casting when they get hot. The effect of pouring temperature on the soundness and size of test castings is shown in Fig. 9. In greensand moulds unsoundness and casting size increase with increasing pouring temperature. In drysand moulds the effect of pouring temperature on mould-wall movement is small. In cement-sand moulds increasing pouring temperature may actually cause a reduction in casting size and unsoundness[2]. In very-large castings high pouring temperatures lead to excessive shrinkage of the liquid during cooling prior to solidification. This is a separate effect which is seldom of importance in smaller castings. Both nodular and phosphoric irons solidify over a greater range of temperature, thus allowing expansive forces to act for a longer time and in greensand moulds this probably mildly contributes to unsoundness. However, the major causes of unsoundness in these irons will be discussed below.

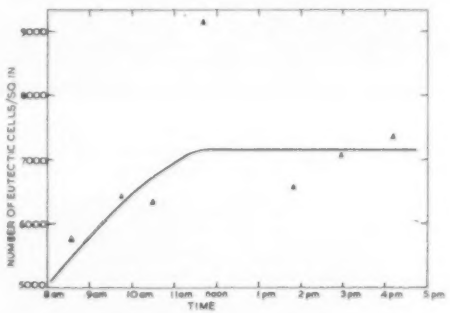


FIG. 16.—*Eutectic-cell numbers in test castings made throughout the day from metal in a hot-blast cupola.*

Solidification-expansion Force

In addition to hydrostatic pressure, the solidification of the eutectic causes an expansive force

which, if not rigidly contained by the mould, will increase casting expansion and may thereby cause unsoundness. The solidification-expansion force may vary greatly and an extreme example of this is shown by comparing the soundness of flake and nodular-graphite irons. Fig. 10 shows keel-block test castings, in greensand moulds, made from irons of the same composition but differing graphite structures. The nodular-graphite iron exhibits greater apparent shrinkage because it exerts greater force on the mould, to yield a larger casting requiring more feed metal. In Fig. 10 increased swelling of the nodular iron keel is easily visible. However, if the nodular iron is poured into a sufficiently-rigid mould it will be as sound as the flake-graphite iron, as may be seen from Fig. 11[3], showing nodular-iron castings made in green- and cement-sand moulds. Thus the shrinkage of nodular iron is explained in a rational manner.

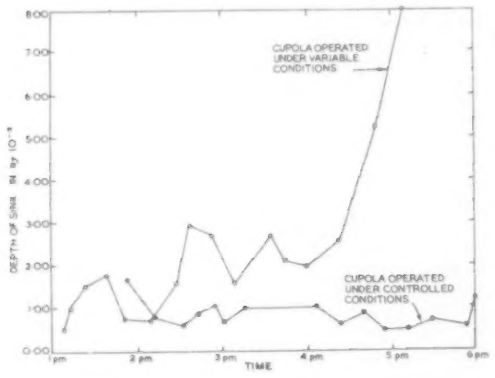


FIG. 17.—*Variation of shrinkage throughout the day in castings made from a cold-blast cupola under variable and under constant operating conditions.*

Inoculation

Ladle inoculation with ferro/silicon or other graphitising inoculants promotes unsoundness, especially in thin-sectioned castings. This effect is now very well established and is illustrated by Fig. 12. As might be expected, from the earlier discussion, inoculation increases the size of castings, which is undoubtedly associated with its effect upon soundness[4]. This is illustrated by Fig. 13. The mechanism by which inoculation increases unsoundness is not yet fully elucidated, but it is certain that the critical factor is the number of eutectic cells which grow in the casting. Inoculation greatly increases the cell number, as may be seen from Fig. 14, and an extensive series of observations has shown that there is a marked relationship between the cell number and the soundness. Fig. 15 shows the relationship between surface shrinkage in a test casting and eutecic cell number[5].

Basically, the number of eutectic cells is governed by the condition of the molten metal, which may vary widely according to the chemical composition and physical conditions of melting. This condition of the metal corresponds with the metal quality long recognized by experienced operators, and has a very important influence on the occurrence of unsoundness in light-sectioned castings in particular. Almost all melting and molten metal handling variables influence the metal quality and Figs. 16 and 17 illustrate the variations in cell number and shrinkage which were obtained in metal from typical cupolas throughout the day.[6, 7] The soundest castings in each case occurred in the morning and corresponded with the lowest cell number. The variation was largely overcome by maintaining more-consistent cupola operation through more-uniform charging and ensuring an absolutely-constant blast rate. The pattern of variation observed is not necessarily typical but the amount of variation is characteristic of common melting practice.

(To be continued)

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[2] K. E. L. Nicholas. "Effects of Mould Rigidity, Moulding-sand Properties and Pouring Temperature on the Soundness of Unfed Grey-iron Castings." BCIRA *Journal of Research and Development*, 1958, **7**, 446 to 452.

[3] I. C. H. Hughes, K. E. L. Nicholas, A. G. Fuller and T. J. Szajda. "Factors Influencing the Soundness of Grey-iron Castings." *Modern Castings*, 1959, **35**, March, 73 to 89.

[4] K. E. L. Nicholas. "Inoculation and Casting Expansion." *BCIRA Journal*, 1961, January, 103 to 116.

[5] A. G. Fuller. "Further Studies on Some Factors Influencing Sinking under Bosses on Thin Plates: Role of Eutectic Nucleation." *BCIRA Journal of Research and Development*, 1958, **7**, 157 to 170.

[6] J. Dews and A. G. Fuller. "Sinking under Bosses on Thin Plates." *BCIRA Journal of Research and Development*, 1959, **7**, 392 to 400.

[7] A. J. Shore and A. G. Fuller. "Effect of Cold-blast Cupola Operation on Soundness of Light-section Grey-iron Castings." *BCIRA Journal*, 1960, **8**, No. 4, 588 to 607.

A COPPER-POWDER PLANT which will produce high-quality copper strip, tubing and wire from ores using no melting process, is to be built on Iligan Bay, on Mindinao Island in the Philippines at a cost of approximately $23,000,000. The Foster Wheeler Corporation, of America, will be the main contractor for Marinduque Iron Mines Agents, Inc., the Philippine company which will own and operate the plant. Special rolling equipment developed by E. W. Bliss Company, Canton, Ohio, will be used to roll the powder into strip. The ores will be made into finished copper products by chemical leaching, gaseous reduction and newly-developed rolling methods.

"SHEFFIELD AND INDUSTRY has been very wise in putting its eggs in so many different baskets," said Mr. R. S. Bruce, president of Sheffield Chamber of Commerce at the annual dinner/dance of the Sheffield branch of the Institute of Cost and Works Accountants at the Grand Hotel, Sheffield, on April 7. He said that in the "good"—or "bad" old days, the city had four industries, steel, cutlery, silver and tools. To-day it had 95 different types of industry and was no longer dependent on one particular type of product. This enabled the city to keep up employment and the recession in the motor industry had had very little effect.

Forthcoming Events

APRIL 24

Institution of Plant Engineers

West and East Yorkshire branch: "Introduction of Planned Maintenance Systems," by A. F. Stedman, 7.30 p.m., in the Houldsworth School of Applied Science, Leeds University.

APRIL 25

Institution of Plant Engineers

South Wales branch: "Fuel Efficiency," by W. Short, 7.30 p.m., at the South Wales Engineers' Institute, Park Place, Cardiff.

APRIL 26

Institute of British Foundrymen

Birmingham branch: Annual general meeting followed by a "Brains Trust" with a panel of foundrymen from the East Midlands branch, 7.15 p.m., at the James Watt Memorial Institute, Great Charles Street.

Southampton section: Annual general meeting followed by "Foundry Sands and Moulding Materials," by W. B. Parkes, 7.30 p.m., at the Technical College, St. Mary's Street.

Institution of Plant Engineers

Leicester branch: "Mechanical Handling," by N. A. L. Thorne, 7.30 p.m., at the Midland Hotel, Leicester.

APRIL 27

Institution of Plant Engineers

Sheffield and district branch: "Portable and Stationary Compressors," by C. A. F. Mackintosh, 7.30 p.m., at the Grand Hotel, Sheffield.

Merseyside and North Wales branch: "Problems Associated with the Running of a General Engineering Works," by C. J. Wright, 7.15 p.m., at the Blossoms, Chester.

Institute of British Foundrymen

Northampton section: Annual general meeting followed by "Work-study," by C. M. G. Wallwork, 7.30 p.m., at the Technical College, Wellingborough.

APRIL 28

Institute of Vitreous Enamellers

Southern section: Annual social evening comprising a dinner in the Gallery Lounge of the Grosvenor Hotel, Victoria, London, S.W.1, followed by a visit to the Victoria Palace where the Crazy Gang are presenting the "Young in Heart."

Institute of British Foundrymen

Lincolnshire branch: Annual social evening in the Technical College, Cathedral Street, Lincoln, at 7.15 p.m.

APRIL 29

Institute of British Foundrymen

Slough section: Annual social evening: visit to Prince of Wales Theatre to see the "World of Susie Wong," followed by dinner at the Fosters Hotel, Egham, Surrey. (Coaches leave the Community Centre at Farnham Road, Slough, 4.30 p.m.)

Film: Safety and Solvents

A new 16-mm. colour film (running time 16 min.) on safety precautions in the handling of highly flammable materials has been produced by the Distillers Company, Limited. It was made at the Salt End, Hull, industrial chemicals factory of D.C.L. Chemical Division under the supervision of Mr. J. Howlett, B.SC., F.R.I.C., division director and general manager, who is an authority on safety precautions in the field covered. The elaborate precautions taken at a chemical factory, particularly those designed to prevent the generation of static electricity, are detailed in this film with the assistance of animated diagrams. The film is available on free loan to responsible organizations on application to the Distillers Company, Limited, at Mayfair Place, London, W.1. It has particular interest now that storage of low-flash-point liquids in foundries is commonplace.

Texans in N. Ireland

Mr. Harold E. McGowen, Jr., president of Camco Incorporated, Houston, Texas, said in Belfast recently: "If we again had the choice of placing a plant in any part of the world, we would again choose Northern Ireland." Mr. McGowen was speaking at a ceremony to mark the official opening of the Camco, Limited, factory at Carnmoney, near Belfast, where at present 60 employees manufacture gas-lift valves and allied equipment for oil-wells. He said that they had found a great availability of labour, ready co-operation from the Ministry of Commerce, a happy reception and excellent conditions.

Lord Glentoran, Leader of the Northern Ireland Senate, formally declared the 18,000-sq. ft. factory open. He said: "We first heard that Camco were looking for factory space in July, 1958. We had a suitable advance factory almost completed. Camco sent us proposals in August, moved into the factory in November, began assembly in December and in January, 1959, the first items were coming off the production line."

The Minister added that the company had made steady progress and its value was out of proportion to its size. He regarded it as a success from all points of view because the firm employed entirely men in the labour force, the product gave diversification to Ulster's industrial structure, and the company's business was an export one.

Correspondence

To the Editor of the FOUNDRY TRADE JOURNAL.

SKILL WHERE IT'S NEEDED

SIR,—I purchase the FOUNDRY TRADE JOURNAL every week and would especially like to refer to the article written by "Barrister-at-Law" on page 408 of the March 30 issue, also the correspondence printed on the above subject in the February 16, March 9 and 23 issues and your "Leader" in the April 6 JOURNAL, in relation to the foundry craftsman.

I am 38 years of age, have been in the foundry since I was 14, served a full apprenticeship, and class myself a skilled moulder. I came to the Midlands nearly a year ago from the North of England, because work was getting short there, though I had held the position of head moulder at a foundry in the North for 12 years. However, since the move, I have not been able to obtain a decent job in the trade. (For the few positions I have been offered, I have known labourers being offered better wages.) It is not for the lack of trying, I have answered numerous vacancies advertised in the FOUNDRY TRADE JOURNAL and 90 per cent. of the advertisers haven't even had the courtesy to acknowledge* my letters, especially those who advertise under box numbers. Yet we read every week about directors "bleating" at dinner parties that skilled men are hard to find!

I am not asking for a free house, car, or anything else free, all I am asking for is the chance to prove my skill as a craftsman. The point of my letter is that small wonder the craft is diminishing when no one seems to want to give a craftsman, who takes both pride and interest in his work, a proper job with a living wage.—Yours, etc.,

(Name and address supplied but, for obvious reasons, not printed).

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* For our part, we repeatedly urge advertisers to acknowledge applications for employment; anonymity can still be preserved when so doing, if it is considered necessary.—EDITOR.

An Exercise in Market Development

"Open House" at the Balbardie Steelworks of North British Steel Foundry, Limited

"Welcome" was on the mat at the Balbardie Steelworks in Bathgate of the North British Steel Foundry, Limited, when the works and offices were open for inspection by customers and other visitors on March 21*. The event was a further phase of a long period of market development which the company has fostered—both north and south of the Border—to extend sales of its products and it proved a most worthwhile undertaking. The weather, informality and friendliness of staff and guests alike combined to make it a happy and memorable occasion. As market development is of topical interest in the foundry industry of today, the opportunity is taken fully to report the arrangements made at North British and to make observations on procedures which, in the opinion of the writer, to a large measure ensured the day's success.

The heading block shows the chief guest, Lord Polworth, examining a cast-steel piston head for a diesel engine, along with Mr. G. M. Menzies, chairman and managing director of North British Steel Foundry, Limited.

Guests had been invited literally from all over Great Britain for North British Steel Foundry, Limited's "Open House" last month and the 100 or more who attended included representatives from among many of the important engineering concerns both north and south of the Border. Quite elaborate arrangements were made for their transport to Bathgate to coincide with the assembly time at the works of 11 a.m., pick up by car being arranged at airports, in Edinburgh and Glasgow, and at various other railheads. On arrival, they were welcomed by a reception group comprising the chairman and managing director, Mr. G. Macbeth Menzies, his brother and fellow director, Mr. Ian Menzies (who has special responsibility on the sales side of the organization), Mr. Douglas Menzies, from the associated steel foundry, Bonnington Castings, Limited, of Leith, and senior executives of both firms.

Following the reception, coffee and other refreshments were taken in a large marquee erected within the works grounds and each delegate was handed a pair of protective goggles to wear during his tour, along with examples of the literature issued by the company. This included illustrated booklets on the foundry itself, and describing facilities and capacities available, in addition to a most-useful "Organization Chart" showing whom of the firm's staff an enquirer should make contact with in the various departments.

Then followed tours of the works spread over the next two hours the visitors being pre-arranged as small parties, each accompanied by a knowledgeable guide. Introductions were made *en route* to managers of the departments visited, all of whom were well briefed to answer the visitors' queries. In this way, the patternshop, foundry, fettling shop, machine-shop, heat-treatment and inspection sections, followed by the laboratory, office block, canteen, etc., all were visited in turn (see Figs. 1 and 2). Then, at the conclusion of the tours, all the parties reassembled in the works club for luncheon with their hosts.

* On the following day the company entertained the Council of British Manufacturers of Petroleum Equipment for similar tours of their works.

Points of Interest

Throughout the tour, the steps the firm has taken to inculcate an awareness among all personnel as to the value of catering for customers' special needs were amply demonstrated. Particularly of interest to the writer was the way in which steelfoundry processes were demonstrated to the layman type of visitor. For example, at three or four stations, display tables were laid out and annotated as shown in Fig. 3 and these served admirably to explain the processes of steelmaking, sand-mixing, heat-treatment, etc., in a graphic manner.

Methods Engineering

Interesting, too, were the explanations given of methods-engineering practices in vogue at the works. This entails, first, a study of the drawing supplied by the customer, following which—and before production begins—the method of casting is worked out. Thereafter, specific instructions are issued for the production of every casting, including the furnishing to the shops of a detailed sketch showing the running and feeding arrangements, etc. On the reverse of the methods card, full instructions are recorded, including directions for coremaking, moulding, steel melting, core placing, heat-treatment, etc. Subsequently, reports on every new design of casting are returned to the methods-engineering section for checking and are afterwards filed with the original control card for readiness when a repeat order is secured.

During the tour, the care given to sand preparation and continuous re-treatment was especially

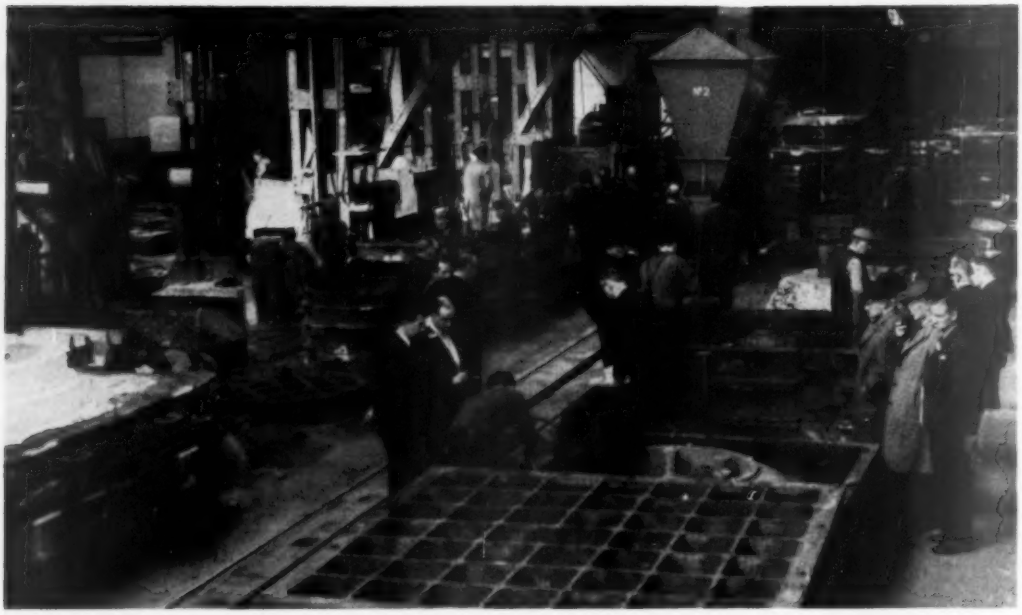

FIG. 1.—*General view of one of the moulding bays at North British Steel Foundry showing, in the background, the mobile 'slinger. Visitors are to be seen inspecting moulds in course of preparation.*

drawn to the attention of the visitors and this complete integration of sand-handling and processing at the works was also new to the writer. It is in fact a culminating feature of rebuilding schemes which to date have cost the company over £800,000 since the war. (Typical sand mixtures being used are shown in Table 1.)

TABLE 1.—*Three Typical Sand Mixtures used at Balbardie Steelworks (ingredients, per cent.).*

Base Sand(s).	Molasses.	Cereal.	Wyoming Bentonite.	Oil.	Initial Water.
(1) Congleton (silica)	0.25	0.75	4.5	—	3.8
(2) Derwent (2 parts) Silica (1 part)	0.5	—	—	—	8.0
(3) Zircon sand (3 parts) Zircon flour (1 part)	—	1.5	—	1.75	3.75

Sand mix No. 1 is a moulding-sand composition used as a facing sand for light castings; mix No. 2 is a moulding-sand composition used as a facing sand for heavy castings; and mix No. 3 is a composition used for coremaking.

Steel Melting

Steel melting, too, has changed since the writer's last visit, when the cupola/converter process was being operated. Nowadays, two arc furnaces, each of a nominal 7-tons capacity, are integrated to cater for the whole foundry demand for molten metal. The melting processes are speeded up by having ample power-load available and employing oxygen blowing as a matter of routine. A further interest in this department for the visitors was the demonstration chart showing the various phases in the melting process, along with the ingredients which go into the making of a typical melt. In the heat-treatment section, also, there was a similar table with photomicrographs of steel sections along with explanations of the type of properties one would expect from the structures exhibited.

Moulding and Auxiliary Operations

The tour continued through the moulding bays where both mobile and stationary models of 'slingers and several moulding machines were at work. Here particular note was taken of the way in which patterns were fed to the 'slingers and the finished moulds "banked"—some on conveyors—to await pouring.

In the machine-shop, considerable augmentation of resources has been secured by recent installations of new and large-capacity machine-tools. Thereafter, in the inspection section, typical procedures were outlined to visitors and on view were a number of machined and as-cast productions from the foundries, demonstrating the organization's capabilities both as regards size and complexity. In this section, too, was arranged a small but quite impressive display of castings produced by Bonnington Castings, Limited, particularly of the smaller types, in alloy steels or stainless varieties. Here it was interesting to learn of the firm's growing export business with America in alloy steel castings.

The total output of the Balbardie works is

FIG. 2.—*Large cast-steel diesel-engine outer cover being examined by two of the guests.*

between 150 and 200 tons finished castings per week, ranging in weight up to 10 tons. Before leaving the works, the parties were invited to survey the various internal transport arrangements employed and it was explained also that external transport is so organized that castings reach their destination even in the furthest parts of England within approximately 24 hours from leaving the works.

Speech Time

When they arrived at the works club after their tour of the works, an excellent buffet luncheon was provided for the visitors. At its conclusion, Mr. Macbeth Menzies addressed the gathering, welcoming particularly Lord Polworth, chairman of the Scottish Council (Development and Industry) and a director of the Bank of Scotland, who was among the guests. Before asking Lord Polworth to say a few words, Mr. Menzies said he hoped the specific objective of the morning's proceedings had been achieved, namely, that the visitors had seen the tremendous efforts the company were making to produce *sound* steel castings and the emphasis which was being laid on customer co-operation in the early stages of a project and in full and detailed inspection before castings left the shops.

Replying to Mr. Menzies and thanking the company on behalf of the assembly, Lord Polworth said that in arranging the visit and demonstration, North British Steel Foundry had done a service not only to themselves, but to Scottish industry as a whole, because he thought the function would do much to dispel two popularly-held illusions. The first of these was that Scottish heavy industry was conservative and old-fashioned in management and outlook. Lord Polworth said that North British had given the visitors a wonderful example of how heavy industry was facing up to the challenge of new techniques and changing markets, with new products, new outlets for them, and still-better service to traditional customers.

The second illusion was that because of the problems of distance and communications, Midlands or Southern firms could not deal with firms in Scotland. Here again, the North British concern, with their 24 hours' delivery, had amply demonstrated the fallacy. When it came to personal communications, one could be in Bathgate by air in three hours from the middle of London or Birmingham or Manchester. He hoped the morning tour had shown to all—particularly those from South of the Border—that Scottish engineering was "up and coming" and looking to the future and could give

FIG. 3.—*Exhibition staged at North British Steel Foundry, Limited, of materials entering into a charge for producing molten steel. Included are samples of original ingredients, refining constituents and finally finishing additives—from which plain and alloy varieties are produced.*

prompt service. Finally, he expressed warm thanks to the North British Steel Foundry, Limited, directors and staff, for their most interesting and enterprising display and for their generous hospitality, and wished them good fortune and success in the future.

Conclusion

In summing up the above report, the writer wishes first to record his own thanks to the directors and other personnel of the North British Steel Foundry for hospitality and services rendered. Secondly, it must be reiterated that the details of this visit to the Scottish foundry are recounted here at length, not because they are in any way unique—indeed the writer has attended others in Scotland, England and abroad perhaps more lavish and with more impressive guest lists. The basic reason for such extensive treatment on this occasion is because the event serves to show what one foundry firm and that of only medium-to-large size can do on its own in fostering a market-development policy. As such, the account, it is hoped, can serve as a model, giving ideas within which other foundry concerns, involved already perhaps in co-operative market-development schemes, can help themselves domestically. After all, assistance seems to flow best from outside to those who first help themselves, whatever the project may be.

Engineering and Non-destructive Testing Conference

A national conference of interest to those concerned with engineering inspection and non-destructive testing is to be held at Oxford in September. The conference will discuss the function of management in relation to inspection, the economics of inspection and non-destructive testing, and the recruitment, education and training of inspection staffs. It is being planned at the request of the Joint Committee of Materials and their Testing and the British National Committee for Non-Destructive Testing, and is being organized jointly by the Institution of Engineering Inspection and the Society of Non-Destructive Examination. The speakers invited are all closely associated with their subjects and have wide experience in the fields concerned. Sessions will be arranged to allow ample time for discussion. Residential accommodation at Queen's College and New College, Oxford, has been reserved over the period September 5 to 8, and the total cost including conference fee, accommodation and all meals in College will be £9 10s. per delegate. Those who wish to have further information should write to the Oxford Conference Secretariat, Institution of Engineering Inspection, 616, Grand Buildings, Trafalgar Square, London, W.C.2. This will involve no obligation but will ensure that full details will be sent as soon as they are available.

GILLETTE RAZOR BLADE COMPANY of the USA are establishing a factory in Melbourne at a cost of £A1,000,000 to meet not only Australian demand, but also to supply those markets in the region which at present import the major proportion of their needs from Britain and the USA.

Equipment and Supplies

Foseco International/Fordath Export Agreement

Foseco International, Limited (Long Acre, Birmingham 7), and the Fordath Engineering, Company, Limited (Hamblett Works, West Bromwich), have announced the formation of Foseco-Fordath Limited, a joint company to license the manufacture and marketing of the Fordath range of corebinder products in world markets outside the United Kingdom. The formation of this joint company will mean that Fordath corebinders will now be available through the sales organization of the Foseco group with its 16 manufacturing and sales units and 43 distributors covering 51 countries. In due course, these products will also be manufactured in many of the Foseco factories abroad. However, within the United Kingdom, the products will continue to be manufactured and marketed exclusively by the Fordath Engineering Company, Limited, and specialized foundry equipment manufactured by the West Bromwich firm is not included in the agreement but will continue to be marketed exclusively by Fordath in all markets.

The Foseco Group was established in 1931 with the formation of Foundry Services, Limited, in Birmingham, England. Since then it has much expanded and, in recent years, has extended activities outside the foundry field to the wrought ferrous and non-ferrous industries. Since 1944, Foseco has been associated with Minerals Separation, Limited, and today Foseco Holdings, Limited, is a subsidiary of that company. Fordath Engineering, Company, Limited, was established in 1921, over the years fostering development of a range of corebinding materials under the trade name "Glyso." Activities have since extended into most classes of corebinding materials, including synthetic resins.

Technical and Research Services

A new corporation to provide research, technical information, investment advisory, and management services in the United States and Europe is being organized by Dr. Clyde Williams, Columbus, Ohio, and his American and European business associates. To be incorporated in Ohio, the firm will be known as the Clyde Williams Corporation, with main offices at 50, West Gay Street, Columbus, and branch offices in London and Paris. Principal stockholders in the new venture will be Dr. Williams; Dr. F. R. Hensel, vice-president, P. R. Mallory & Company, Indianapolis; Dr. L. Kermit Herndon, Columbus; and Mr. Harry H. Jackson, London. They will also serve as directors. The officers of the corporation will be: Dr. Williams, president and chairman; Mr. Jackson, executive vice-president; Dr. H. E. Z. Gordon, London, vice-president; Dr. Herndon, vice-president; and others to be named.

Vibrators: In order to standardize production of their range of rotary electric vibrators, Sinex Engineering Company, Limited, North Feltham Trading Estate, Feltham, Middlesex, announce that in future their units will be manufactured only with lug-mounting bodies. Three types of adaptor will, however, be available—a channel adaptor, plate adaptor and pin adaptor. When fitted with apposite adaptor, the standard machine can thus be used for any application, and will be interchangeable with any old-type machine. Under the new system a new adaptor only becomes necessary instead of a new body.

Lancashire Apprentice Conference

Full-day's Events successfully carried through by the North East Lancashire section of the Institute of British Foundrymen

On March 29, the North East Lancashire section of the Institute of British Foundrymen organized a one-day conference for students attending foundry classes at the Accrington College of Further Education. The event was part of a programme designed to interest the students in the wider aspects of their training and to associate them more closely with the activities of the local section of the Institute.

The background to the Conference was that it had previously been for many years a recognized practice for students at the Burnley Municipal College (where the foundry classes and the IBF N.E. Lancs. section's meetings were then held) to be allowed to attend IBF meetings as part of their tuition. However, with the change in the educational pattern, evening classes in foundrywork at the College were replaced by full-time day courses and the venue was transferred to Accrington. Fortunately, the IBF section, too, was welcomed by the Accrington College and have for a number of years been allowed the use of an excellent lecture hall for their meetings.

Despite all efforts, however, the section officers were unable to persuade students at the Accrington College to attend their meetings—which meant students either staying on at the College after their day classes or returning in the evening. Thus, it was decided to hold the Apprentice Conference, which turned out to be such an unqualified success.

As the aim was recruitment, the organizers tried to give the students a " taste " of what the Institute had to offer and drew up a comprehensive programme including a works visit and technical sessions. Briefly, the programme consisted of a morning visit to the foundry of British Northrop, Limited, at Blackburn, and in the afternoon presentation of a paper by Mr. H. Pinchin (of Stanton Ironworks' Erewash Foundry) entitled " Safety Devices in a Mechanized Foundry," this being followed by showing of the film from Switzerland entitled " The Automatic Buehrer Moulding & Pouring Plant in the Malleable Iron Foundry of George Fischer, Limited."

Proceedings

The meeting was attended by all the foundry students of the College, some fifty in number, who were given permission by their employers to attend on the Wednesday irrespective of their normal release day. About ten members of the Institute were also present, amongst them Mr. F. W. Nield (the Lancs. branch president), Mr. G. Studley (junior vice-president), Mr. D. Kershaw (the local section president), and Mr. H. Tattersall (honorary secretary). The visit to the foundry and pattern-shops of British Northrop in the morning proved most interesting and after the tour the party was entertained to coffee and biscuits by the company in the works canteen. There, Mr. Sykes, the foundry manager, had a few words to say about his company's activities and gave the students some advice on their careers, urging them to make the most of present opportunities for young people to become fully qualified in their chosen profession.

The students then returned by coach to the Accrington College for luncheon, while the IBF members of the party lunched at the Commercial Hotel, Accrington, meeting there the lecturer for the afternoon session, Mr. R. T. Hinds (Stanton Ironworks Company) who was to give the paper on Mr. Pinchin's behalf.

The afternoon proceedings went to plan and the paper, which was illustrated by slides and a film, was very well received. Then, after a break for tea and biscuits, the film on the automatic Buehrer plant was shown, and provided an excellent climax to the day. Indeed the opinion was expressed in many quarters that it would be an advantage to see the film again in order fully to digest its contents.

Vote of Thanks

The meeting closed with Mr. Nield proposing a vote of thanks, in which he complimented the section on its enterprise and also urged the students to join the Institute and share in its work and pleasures. The proposition was seconded by one of the students who expressed on behalf of his colleagues their appreciation of the excellent day which had been prepared for them.

The section intends that the event shall become an annual affair and hopes as a result to forge even closer ties between the students and the Institute.

Armstrong Whitworth to show in Moscow

Founders of rolls of up to 50 tons in size for steel mills throughout the world, Armstrong Whitworth (Metal Industries), Limited, Close Works, Gateshead-on-Tyne 8, are to exhibit at the British Trade Fair, Moscow (May 19 to June 4), on stand 180, hall D. Although the company have been exporting about 30 per cent. of their roll output for some years, they have not until now supplied the USSR. It is hoped, however, to break into this market and contribute to the Soviet Union's expansion of steel production.

With their enlarged roll foundry and machining facilities at Close Works, Armstrong Whitworth's roll-output capacity has been increased to 15,000 tons per year. Mr. T. A. Bird, the company's manager of roll sales, will be in attendance on the Armstrong Whitworth stand, where there will be a display of photographs of the roll-production departments at Close Works.

D

Langley Alloys in Merger

Langley Alloys, Limited, Langley, Bucks, non-ferrous founders, etc., is one of three firms merging with the General Hydraulic Power Company, Limited, London. The two other companies are Hugh Smith (Glasgow), Limited, and Brentford Transformers, Limited, of Crawley, Sussex. Agreement for a merger on a share-exchange basis, has been reached with the boards of the trio, subject to shareholders' approval. If the offers for the shares are accepted in full, the issued ordinary capital of General Hydraulic will be increased from £603,153 to £1,945,593 in £1 shares. The existing shareholders will hold 31 per cent. The shares are currently quoted at around 18s. 6d. Directors of General Hydraulic estimate that combined profits of the four companies for 1961 will be not less than £330,000.

Langleys Alloys Set-up

Langley Alloys, Limited, started by acquiring a site at Langley, Bucks, and building a special bronze foundry in 1939, about a month before the war broke out. Throughout the war, one of its main activities was making castings for topedo engines and in the early stages, a rolling-mill, forge and machine-shop were added. After the war, stainless steel and nickel-base alloys were added to the company's manufacturing programme.

A range of valves has been developed at Langley for the chemical and petro-chemical industries, and a special advisory service was instituted to assist engineers to fight corrosion—the constant enemy of chemical plant. This led to considerable expansion of activities and many export markets have since been exploited. Langley enjoys an advantage over others as practically the whole of the valve components are produced under one roof, including castings and forgings. A large routine and research laboratory contributes towards keeping the firm's metallurgical knowledge up to date and ensures high product quality. It is stated that a number of metallurgical developments are in the course of preparation and will contribute towards expanding activities within the new set-up.

Hugh Smith (Glasgow), Limited, another of the firms involved, was established more than 85 years ago in Possilpark, Glasgow. Heavy machine-tool engineering has always been the mainstay of this company and it claims to be among the world's leading makers of plant for shipbuilding and for boiler tube makers.

Pressure-die-casting of Complicated Aluminium-alloy Castings.—In the translation printed in the April 6 JOURNAL of the Russian article on the above subject (page 437), reference was made to an apparent misprint in the original, recording the tensile strength of the alloy as 20 to 42 kg. per sq. mm. This, it was suggested in a footnote added by the Editor, ought to have read 40 to 42 kg., but on further consideration 20 to 22 kg. per sq. mm. is more likely (12.5 to 13.8 tons per sq. in.)—that is, unless the Russians have developed aluminium alloys of strengths vastly in excess of those produced elsewhere to date!

AEI LAMP & LIGHTING COMPANY, LIMITED, and the General Electric Company, Limited, who last December formed a joint company for the manufacture and sale of glass products, are to form a similar company for the manufacture and sale of molybdenum, tungsten and other metal products associated with the electric lamp and radio-valve industries.

BIM Overseas Conference

"Industrial Growth in Developing Countries" will be the theme of a conference organized by the British Institute of Management, to be held at the Metropole Hotel, Brighton, on April 26 and 27. The conference will be concerned with problems facing United Kingdom companies operating overseas, and those studying export opportunities. The opening speaker will be Sir John Elliot, director of the Commonwealth Development Corporation, and papers will cover such subjects as "Relations with Government and the Community"; "Management and Control of Overseas Interests"; "Employee Relations in Developing Countries"; "Management's Responsibility in Developing Local Human Resources," and "Recruitment and Training for Overseas Management." Dr. M. F. Garcia, president of Motores Perkins, S.A., will be presenting a case-study of the setting up in Brazil of the subsidiary company of F. Perkins, Limited. The High Commissioner for Australia, Sir Eric Harrison, will be principal speaker at the closing dinner on Thursday, April 27.

"Capital" Conference

Another conference organized by the BIM on "Profitable Uses of Capital" will be held in London on Tuesday, May 30. It has been designed for directors, senior managers and accountants and should be of special interest to companies engaged in expansion projects. Sir Frank Lee, Joint Permanent Secretary to the Treatury, is to open the conference, and the four technical papers to be presented are "Planning Capital Expenditure," by Mr. F. C. de Paula; "Controlling Capital Expenditure," by Mr. F. J. Young (Steel Company of Wales, Limited); "Return on Capital Employed," by Mr. A. T. Oram (British Oxygen Company, Limited); and "Diversification or Concentration," by Mr. J. E. Wall (Electric and Musical Industries, Limited). Sir Joseph Latham, financial director, Associated Electrical Industries, Limited, will take the chair for the day.

Leyland in Yugoslavia

Leyland buses are to be manufactured in Yugoslavia under a manufacturing agreement just signed in London between Leyland Motors, Limited, and a Yugoslav company. "Coupled with the manufacturing agreement is a contract for our single-deck buses and spares to the value of over £1 million sterling," said Mr. D. G. Stokes, Leyland sales director in London recently. "The contract and agreement is the result of protracted negotiations in fierce competition with Italian and French manufacturers." This is the first time that manufacturing rights have been arranged in Eastern Europe.

The agreement emphasises the important role which Leyland is playing in the export market, resulting in the shipment abroad of 60 to 65 per cent. of its output in recent years. Immediate effects include the placing of a contract by Industrija Motora Rakovica, of Belgrade, for 160 "Worldmaster" complete buses and long-term aspects are that Industrija Motora Rakovica will have manufacturing rights for the next 10 years to produce in Yugoslavia the "Worldmaster" underfloor-engined passenger chassis, a type designed by Leyland Motors, Limited. Separate agreements are also under consideration by Rakovica with a Leyland associate company for the manufacture of a semi-automatic gearbox similar to the one used in Worldmaster chassis, as well as with a British company for the manufacture of bus bodies.

Stamford Foundry Changes

Progress of a Small Old-established "Family" Business

Before his death in October, 1959, Mr. Dudley Henson, owner of a foundry business at Stamford, Lincs., drew up a will which meant, in effect, that his seven employees would inherit the business. The firm was founded by Mr. Thomas Gibson, a Stamford man, in 1843 to do general foundrywork and railway repairs. An inventor as well as a businessman, Gibson has several inventions to his credit, among them a machine for cutting sugar into lumps. In 1924, the firm was acquired by Mr. F. D. Henson, a Northamptonshire businessman, and while he was in charge steam-engine repairs were discontinued. In later years, Mr. Henson ceased to play an active part in the firm and his employees were made aware that they would inherit the concern. A limited company was formed in October, 1960, and after six-months' working, the firm, T. Gibson & Son (Stamford), Limited, of Star Lane, Stamford, announce that old customers have been retained, several new accounts opened, and business is increasing all round.

To keep pace with demand, the seven men, who have recently taken on their first employee, are working from seven in the morning until eight at night, six days a week. Able to produce a wide variety of products, the foundry specialises in "one off" castings. The three directors are Mr. F. E. Locke, a moulder, who has been with the firm for 35 years; Mr. J. W. Short, who looks after the administration side and has 33 years' service, and Mr. E. Tyers, welder and foundry manager, who joined the firm in 1939.

The other four of the original employees—all shareholders—are Mr. J. Lilley (moulder), with 20 years' service, Mr. S. Lipscomb (machinist and foundry assistant), who has been with Gibsons for 15 years, Mr. Colin Mee (moulder), who joined the firm in 1950, and Mr. C. Exton with seven years' service.

Present and Future

The foundry is situated in old, rambling property covering about 45,000 sq. ft., and comprises machine-shop, iron and brass foundry and general repair shop. Mr. Tyers told the JOURNAL'S representative: "We find there is a switch from agricultural castings to higher-class castings, which means the bigger people are prepared to give us work. Orders come from within a 40-mile radius and we make time to go out and look for more."

Nearly all the work in iron, bronze, brass and aluminium, and alloys, such as gunmetal, is done strictly to customers' specifications. A large number of patterns are held for repeat orders, but most items are cast to special requirements. The only limit at present is one of size. Iron castings are made up to 8 cwt., and shortly bronze castings will be made up to 400 lb.

Some of the firm's products are engine-components, machine-tool parts, jigs and fixtures against local orders, items for the cement and brick trades, furnace castings, iron castings for steelworks and agricultural-implement components. (Incidentally, the firm recently produced a cast replica of a plaque depicting the "Last Supper.") Almost all the castings are hand moulded there being no mass production.

Plans are in hand for the first phase of a modernization programme—a £5,000 replacement for the old machine-shop—but the directors are hampered by their closed-in position in a busy part of the town, and the fact that the provisions of the agreement under which they inherited the business prevent them from borrowing capital or taking on extra shareholders. Despite this, they have been able to instal two new furnaces recently, costing £450.

There are no board meetings, as all decisions are made at conferences held in the works and attended by directors and shareholders. None of the men has served an apprenticeship, but most have been with the firm since leaving school and are fully acquainted with all the manufacturing processes operated. Gibsons face the future with confidence founded on fattening order-books and because they believe that despite the developments in automation which will make their larger competitors more and more efficient, there will always be a demand for the unusual or single casting.

ATLAS CONSOLIDATED MINING AND DEVELOPMENT CORPORATION, in the Philippines, earned an operating income of 30,306,693 pesos last year from the sales of copper, iron, pyrite and gold, and profits from merchandising, according to the president, Col. Andres Soriano, in the annual report. Net income after taxes was slightly over 2 million pesos, as against 5,600,000 pesos in 1959, when operating income totalled 36 million pesos. Col. Soriano noted that problems attendant to waste removal were primarily responsible for low production during many months of the year and caused paramount concern.

ASQUITH MACHINE TOOL CORPORATION, LIMITED, Halifax, have secured orders from Japan worth about £150,000. This is regarded as an important breakthrough in a market where the Germans are so successful. The major part of the order is for a £100,000 6-in. ram-type horizontal boring and milling machine for the heavy electrical industry. The machine, to be built at the Highroad Well Works, Halifax, of William Asquith, Limited, will be forwarded to Japan from the Brussels Machine Tool Exhibition, which is being held in September. Other Japanese orders for the Corporation are for radial drills and gear-cutting machines.

British and German Productivity Visits

The Birmingham Productivity Association—as one of its activities—arranges visits to and from continental industrial centres in co-operation with member-firms in the area. This is done in conjunction with the productivity associations of the countries concerned. The object of these visits is to enable members of the management team whether administrative, technical or trade union to gain some idea of industrial methods and conditions in other countries. As part of this programme the Birmingham Productivity Association has exchanged visits with the *Rationalisierungs-Kuratorium Der Deutschen Wirtschaft* (or RKW), for Düsseldorf, one of the most important industrial areas in Germany.

The RKW, in conjunction with the *Verein Deutscher Giessereifachtleute* (VDG), (the German Foundrymen's Technical Association), last summer paid a visit to medium and small iron foundries in Italy which proved very interesting and they suggested to the Birmingham Productivity Association that it would be of interest to organize an exchange of visits between ironfounders in Germany and in the Midland area. The BPA was very glad to co-operate in this project and arranged a programme of visits between April 10 and 14. The foundries visited included the Brockmoor Foundry Company, Limited, Lee Howl & Company, Limited, Bullers, Limited, Arthur Shaw & Company, Limited, John Harper & Company, Limited, and Duport Foundries, Limited. Between them, these establishments cover both blackheart and whiteheart malleable, Meehanite and grey-iron castings. In addition to visits to foundries, the party were invited to see some of the work which is being carried out by the British Cast Iron Research Association at Alvechurch, and a visit to Stratford and the Royal Shakespeare Theatre was included in the programme.

The main interests of the visitors were on improvements which could be made to material handling and planning, especially for short runs in small and medium-size foundries, the control of dust and the general improvement of productivity. The visiting party numbered 33 in all, drawn from 22 different foundries, and was under the leadership of Dr. Seidemann of the RKW and Mr. Engels of the VDG. Arrangements are being made for a return visit by Midlands foundrymen in the autumn and it is quite possible that a second visit from Germany will also be arranged.

Load Measurement by Elastic Devices

The latest addition to the National Physical Laboratory's series *Notes on Applied Science**, published on April 12, deals with the measurement of load by elastic devices. The *Note* defines the technical unit of force used when elastic devices are calibrated and outlines the facilities available at NPL for their calibration.

Descriptions and comments about their use are given for the more common types of elastic devices such as proving rings, standardizing boxes, hydrostatic load capsules and electrical-resistance strain-gauge load-cells. Guidance is also given on the accuracy of load measurement which can be expected from many of these. Two final sections deal with temperature corrections and methods of plotting the calibration results.

* "Measurement of Load by Elastic Devices" NPL Notes on Applied Science No. 21. Published for the Department of Scientific and Industrial Research by Her Majesty's Stationery Office; price 3s. (by post 3s. 4d.), USA 54 cents.

Scrap Metal Trade Future causes Concern

Concern for the future of their business is being shown by the iron and steel scrap merchants. At a luncheon in Cardiff recently, Col. W. Harold John, president of the South Wales and Western Counties Association of Iron and Steel Scrap and Tinplate Merchants, posed the question: "Was the scrap merchant to play a big part in meeting the increasing quantities of raw materials needed in the big steel expansion plans, or would science and new processes make their role a diminishing one?" Col. John said that at the moment the trade was passing through a recession: "We hope it is only a hesitation."

He went on: "If those in the know have sufficient confidence to spend large sums on such huge schemes as the big new steel works at Newport, then I see no reason for apprehension on our part."

Mr. C. Rollinson, president of the National Federation of Scrap Iron, Steel and Metal Merchants, said he had no lack of confidence in the future. Suggesting that they should not talk themselves into a recession, Mr. L. R. P. Pugh, managing director of Guest Keen Iron & Steel Works, Cardiff, contrasted the position in 1958, when capital investment was at a low ebb, with today, when it is very high.

Scrap Shortage in Midlands

The opposite side of the picture was reflected by Mr. A. O. Cox, commercial manager of the Round Oak Steel Works, Limited, speaking at the annual luncheon of the Midland Scrap Iron, Steel and Metals Association, in Birmingham, who mentioned the increasing concern about shortage of scrap. As a result of the heavy drain on stocks forced upon them by the shortage, steelworks in the Midlands, he said, were having to take large tonnages of scrap out of stock every week. He hoped, however, that the start of summer time, which would mean longer hours of daylight working, would enable merchants to rectify the shortage. "It will be serious indeed if stocks continue to fall at their present rate," he added. It was also necessary, he went on, to give immediate attention to the alarming increase in the content of copper in steel scrap. Merchants in the scrap trade, as well as the actual producers, should ensure high standards in British quality steels. There was still little scope for exports in scrap because all available supplies were needed at home.

Mr. J. D. Norton, president of the Association, said a decline in the precision of scrap sorting was an inevitable result of the competition stemming from a booming market and heavy demands. In the long run, however, it was detrimental to both user and supplier. To maintain high quality it was vital to have full agreement between both sides of the industry.

BICTA Conference

A small amendment has been made to the programme of the annual conference of the British Investment Casters Technical Association (May 15 to 17, at Connaught Rooms London). It is that one of the papers to be presented on behalf of Monsanto Chemicals, Limited—that in the second technical session—will actually be entitled "Polystyrene—a Material for Patterns." It will be delivered by Mr. C. H. Waxman.

European Foundry Apprentice Competition

Three three apprentices who will represent the United Kingdom in the Fourth European Foundry Apprentice Competition, to be held at Munich from May 15 to 19, 1961, have now been selected. The British apprentices —who will compete against some 20 boys from eight countries—are:—Mr. A. Morris, of Wallsend Slipway & Engineering Company, Limited, Wallsend-on-Tyne; Mr. M. J. Rosendale, of K. & L. Steelfounders and Engineers, Limited, Letchworth, Herts., and Mr. E. R. Y. White, of Le Grand Western Foundries, Limited, Southall, Middlesex. Mr. Morris and Mr. White are ironfounding apprentices.

The British competitors were chosen from 61 candidates who fulfilled the preliminary entry standards in craft skill technical education. Six were selected under the auspices of the Institute of British Foundrymen for a final week of tests, and from these the three representatives were chosen by independent assessors.

In the competition proper, the candidates will be required to make a casting from patterns chosen by an international jury, and will answer written papers in foundry technology, calculations and drawing.

The competition, which is organized by the Training Committee of the European Committee of Foundry Associations, is being held just one year after the third competition which took place in the Midlands in 1960. Last year's British team were second to the French in the team competition and British apprentices took second and third places in the individual classification. France has won the team competition twice, and West Germany once.

The UK is also sending three judges to assist in marking the results. They are:—Mr. J. Bamford, head of the National Foundry College, Wolverhampton; Mr. G. H. Charsley, managing director, Trent Foundries, Limited, Stoke-on-Trent, and Mr. P. D. Pincott, managing director, Erifo, Limited, Erith, Kent.

FBI Plan to increase Exports

A five-point plan to increase exports was put forward by Sir William McFadzean, retiring president of the Federation of British Industries, at the federation's annual meeting in London on April 12. He said that the UK must aim at a rise of at least 10 per cent. in exports during 1961, and the first of his points was that more attention must be given to the tastes and requirements of overseas customers, and a better delivery service.

Sir William urged those concerned to "put their house in order" and render the most competitive and effective assistance to the cost of British exports, and the third phase of his plan concerned salesmen. There were not enough salesmen on the road, in the first place. Salesmen should be able to speak languages, know the feelings and appreciate the requirements and aspirations of the countries to which they were selling, and should be given maximum status.

Sir William also dealt with salesmanship and asked: "How effectively do we tell the world about outstanding British firsts in the scientific and industrial spheres, and of how modern and efficient most of our industry is?" Finally, he called for flexible and speedy implementation in credit and credit insurance regulations. "I feel there should be a more simplified method of obtaining finance where credit can be given."

British Export Missions

British exports to Europe can be substantially expanded if existing opportunities are seized promptly, and full regard paid to individual country's requirements. This is the general finding of members of the Export Council for Europe following "pathfinder" missions recently made to Austria, Denmark, France, Italy, Norway, Portugal, Spain, Sweden, and Switzerland. Detailed reports by each team are now being studied by the Council as a whole, which is to publish its full findings and recommendations next month.

The reports have confirmed the value of the missions, says the Council, and further ones are planned to Ireland, West Germany, Holland, Belgium and Luxembourg, Turkey, Finland, Greece, and Iceland. Among current and future missions will be: Ireland (April 17-21), Mr. R. W. Weekes, managing director, the Harland Engineering Company, Limited; West Germany (May 1-6), Sir William McFadzean, chairman of the Export Council for Europe, and chairman of British Insulated Callender's Cables, Limited; Mr. A. M. Browne, chairman and managing director, Hackbridge & Hewittic Electric Company, Limited; Mr. O. F. Reichwald, managing director, Daniel Adamson & Company, Limited; and Mr. J. C. Snow, director, Snow & Company, Limited.

Belgium and Luxembourg (May 1-5), Mr. R. W. Weekes; Turkey (May 7-10), Dr. A. Caress, director, Imperial Chemical Industries, Limited; Finland (May 22-25), Sir Norman Kipping, director general of the Federation of British Industries; Mr. Brian Rootes, managing director, Rootes, Limited; Greece (May 28-June 1), Mr. J. Hugh Neill, deputy chairman and joint managing director, James Neill & Company (Sheffield), Limited; Yugoslavia (between August 21 and 29), Sir William McFadzean, Mr. Peter Tennent, overseas director of the Federation of British Industries.

Iron-making Plant completed at Durgapur

With the satisfactory testing of No. 3 blast furnace, now ready for operation, the entire iron-making facilities at the Durgapur Steelworks, West Bengal, India, have been completed. Like its predecessors, No. 3 is rated to produce 1,250 tons of iron per day and this output has already been frequently exceeded on No. 1 and No. 2 blast furnaces. The iron-making plant will produce hot metal for the melting shop and iron for foundry uses.

The three blast furnaces are fed by a comprehensive coke, iron-ore, and limestone handling system feeding into bunkers on the furnace high line. All raw materials are carried from the bedding plant by a conveyor system, although provision has also been made for feeding the furnaces by rail-borne raw materials.

The iron-making plant at Durgapur has been designed and erected by a member company of the Indian Steelworks Construction Company, Limited, (ISCON).

"ON THE SPOT" NEGOTIATIONS in Addis Ababa by Mr. J. F. D. Wood, general sales manager of the standard steel building division of Sanders & Forster, Limited, of Barking, Essex, and Stratford, London, has secured for the firm an order for the supply of structural steelwork for a 75,600 sq. ft. extension to a cotton textile mill in Ethiopia. The order has been placed by Indo Ethiopian Textiles S.A., of Addis Ababa.

News in Brief

TYPICAL RATE INCREASES on industrial premises in the revaluation of Aberdeen include Richards, Limited, Broadford Works, up from £3,117 to £9,000; Hall, Russell & Company, Limited, shipbuilders, up from £2,872 to £6,325; John M. Henderson, Limited, engineers, up from £1,116 to £3,250.

THE TWO large steel castings which have been recovered from the coaster Lurcher which sank in the Mersey estuary 11 weeks ago are now undergoing rigorous tests to make certain no damage was caused by their immersion. The castings are for the new slabbing mill at Ravenscraig of Colvilles, Limited.

THE LEICESTER FIRM of Partridge, Wilson & Company, Limited, electrical-equipment manufacturers, are to open a factory in Inverness which, initially, will employ between 25 and 30 persons. A sum of £25,000 has been allocated to meet the early costs of expansion. Production is expected to begin in about a year's time.

AN ORDER HAS BEEN PLACED with Ferguson Bros. (Port Glasgow), Limited, for two tugs for the Clyde Shipping Company, Limited, Glasgow. The contract has been placed with fixed delivery date and at a fixed price which, the owners state, compares favourably with prices quoted by Continental firms who were asked to tender.

IN GIVING THE LIST of guests at the Cutlers' Feast in the News in Brief feature of our March 16 issue, it was incorrectly stated that Mr. Cyril Musgrave was chairman of the Iron and Steel Federation, whereas he is in fact chairman of the Iron and Steel Board. Apologies are recorded to the principals and all readers who were confused.

IT IS ANNOUNCED by Colloidal Graphite, Limited, Sheaf Island Works, Pond Hill, Sheffield 1, that on May 1 the name of the company becomes Susgra, Limited. The company's sales and manufacturing policies will be unchanged and continue under the direction of Mr. A. A. Simons, who has been appointed to the board of Susgra.

THE TRANSFORMER DIVISION of Associated Electrical Industries, Limited, has received an order from Birlec-Efco (Melting), Limited, covering two 35-mva arc-furnace transformers to be installed at the Tinsley Park Works of the English Steel Corporation, Limited, Sheffield. They will be designed and manufactured at the AEI works at Rugby.

AMONG SHEFFIELD WORKS on the programme of tours by a party of 14 overseas students on a course arranged by the British Council during the week beginning April 10 were Samuel Fox & Company, Limited, Stocksbridge, Samuel Osborn & Company, Limited, Barnard & Son, Limited, cutlers, Rockingham Street, Sheffield, and Maltby Colliery.

THE INSTITUTION OF MECHANICAL ENGINEERS from 1, Birdcage Walk, Westminster, London, S.W.1, has just issued a consolidated list of advance copies of papers and lectures published by the Institution since June, 1960. It details no fewer than 60 separate papers plus over 80 individual contributions to various symposia organized with the Institution's auspices.

A MECHANICAL ENGINEERING FIRM concerned mainly with the making of seamless steel-tubes, hollow forgings and other specialized work is to set up a works in Airdrie, Coatbridge. The firm—F. J. Haut & Partners, Limited, Purley, Surrey—have acquired the buildings of the former Bellsdyke Foundry in Hogg Street. More than 50 skilled engineers and apprentices will be employed, it is stated.

A TWO-DAY seminar on manpower and shop-loading scheduling will be conducted by Mr. William Imbrie, general manager, Mauchly Associates, professional consultants in management planning, in London on May 11 and 12, in Birmingham on May 15 and 16, and in Manchester on May 17 and 18. Details and registration forms may be obtained from Materials Management International, Limited, 66, Chandos Place, London, W.C.2.

THE INTERNATIONAL NICKEL COMPANY OF CANADA, LIMITED, has issued a 20-page well-illustrated brochure to describe the activities of the new nickel township of Thompson, Ontario, Canada. It was officially opened on March 26, after over three-years of hard work in not only equipping the mine and works but in providing a new town replete with hospital, school, shops and cinema. In general, it tells the story of a very wonderful development.

MR. KENNETH KERSHAW, sales director, William Asquith, Limited, Halifax, has returned from an overseas tour, covering India, Hong Kong, Japan, the United States and Canada, on behalf of the Asquith Machine Tool Corporation, Limited. In India he visited the site of the factory being built at Bhopal, in connection with the new British-sponsored heavy electrical project. The Corporation has received orders for machine-tools for the project.

THE 95,000-STRONG United Society of Boilermakers and the 11,000-strong Associated Society of Blacksmiths were formally amalgamated at a meeting of the joint union executive in Glasgow on April 6. Headquarters of the union will be in Newcastle, where the boilermakers' headquarters are situated. The blacksmiths' national headquarters in Glasgow will move there at the end of the year; their present offices will remain in use as district headquarters.

THE FRACTURE OF A FEED PIPE during the pre-heating of two oil-fired furnaces led to a fire in one of the foundries of the Sandwell Casting Company, Limited, Bank Street, West Bromwich. Spilled oil became ignited and the heat cracked a section of the asbestos sheeting wall and roof. Some piping and electric wiring were also damaged, but a spokesman for the firm said that with a reserve furnace available interference with production would be very slight.

NEW TONNAGE OXYGEN PLANT which British Oxygen Company, Limited, is adding to existing plant at their Warren Lane works, Scunthorpe, will increase capacity by 200 tons a day to 600 tons. The new unit is scheduled to enter service towards the end of 1962, and with additional liquid oxygen storage capacity will cost nearly £750,000. A 200-ton plant is already piping gaseous oxygen to local steelworks from Warren Lane and a similar unit is due to start operating late this summer.

THREE NEW HYDROELECTRIC POWER-STATIONS have been opened in Tasmania's central highlands, and will increase her power generating capacity by 223,000 kw. They were built at a cost of £A27,000,000. The stations will provide cheaper power for the production of aluminium, zinc, copper, paper, and other commodities. State Premier Reece said that the cost of electricity in Tasmania was less than half the average cost in the mainland States. In addition, Tasmania used 4½ times more electricity per capita of population as the rest of Australia.

SOME OF THE BUILDINGS in Westbourne Road, Broomhill, Sheffield, formerly the head offices of the United Steel Companies, Limited, are to be converted into a residential training-centre for staff of the firm. Work which is to start soon will enable 20 students to be

housed at a time, together with the chairman and organizer of the course in residence. The buildings stand in large grounds and have a bowling green and tennis courts. Many staff courses organized by the firm since the war have been held, originally at the Maynard Arms and later at the Kenwood Hotel, Sheffield.

DEWRANCE & COMPANY, LIMITED, Great Dover Street, London, E.C.1, announce the formation of the Dewrance Metals Division, which will consist of the foundry at Hillington and the special-alloys division in London. It will have its own board of management and will be responsible for the production and sales of high-quality non-ferrous castings, nickel-alloy castings, stainless-steel castings, "Endewrance" hard-facing and high-temperature brazing alloys. The production executive is Mr. J. B. Morton situated at Hillington, and the sales and technical executive is Mr. E. Wallace situated in London.

SCOTLAND'S SHARE of a £55,000,000 order for the construction of a nuclear power-station at Sizewell, Suffolk, on which work has begun, will keep the Renfrew and Dalmuir works of Babcock & Wilcox, Limited, busy for about two years. An official of the firm said the order is particularly valuable, as it will help to prevent redundancy after work on the Hinkley Point (Somerset) nuclear power-station is completed. The heavy mechanical engineering parts and some of the nuclear engineering components will be made in Scotland and shipped for complete fabrication and erection on the site.

FULLER INSTRUCTIONS for operating switchgear should be made available at electricity sub-stations recommended the jury at a Keighley inquest on April 7 after a 7½-hr. hearing into an explosion which resulted in the deaths of two employees of the Yorkshire Electricity Board. They also suggested that senior workers, who are the only people allowed to operate the switchgear, should be made familiar with all types of the equipment, and that internal maintenance of the switchgear should be carried out from time to time. The explosion occurred at the Sawmills sub-station in Lawkholme Lane, Keighley, on March 6.

OVER THIRTY VISITORS from the Düsseldorf Productivity Centre (RKW) and the German Foundrymen's Technical Association (VDG) spent between two and three hours on Tuesday morning of last week touring Brockmoor Foundry Company, Limited, manufacturers of blackheart mallable and grey iron castings, of Brierley Hill, Staffs (see page 506 of this issue). Afterwards, the overseas party were entertained to luncheon by the firm at the Station Hotel, Dudley, when the company included also officials of the Birmingham Productivity Association (who arranged the series of visits) and others, making a total of 50 guests.

A NEW INDUSTRY FOR SCOTLAND, the manufacture of portable refrigeration trays, has been started up with the formation of Heat Pump & Refrigeration-Scottish, Limited, at Irvine. At present the company has only a small factory employing about a dozen people, but, comments an official of the company, the product "is only in its infancy yet and has not been launched forth to any great extent. We hope during the course of the summer to get the feel of the market and expand—there is a large potential market for these trays." The man behind the project is Mr. T. D. Robertson, a senior executive of Scottish Aviation, Limited, Prestwick, Ayrshire.

THE MINISTER OF LABOUR, Mr. John Hare, has used his powers under the Factories Act, 1959, to re-appoint the Joint Standing Committee on Health, Safety and Welfare in the Drop Forging Industry. The function of the Committee, which has been appointed for three years, is to advise the Minister on matters affecting the health, safety and welfare of persons employed in the drop forging industry. It replaces and will continue the work of the joint standing committee for the drop-forging industry which was set up by the Chief Inspector of Factories in 1954.

W. H. ALLEN SONS & COMPANY, LIMITED, Bedford, have received an order from Thames Board Mills, Limited, of Purfleet, Essex, for the supply of one 10.5-mw pass-out back-pressure turbo-alternator set. The machine will be designed to operate with steam at 600 lb. per sq. in. gauge and 740 deg. F, passing out up to 120,000 lb. per hr. of process steam at 55 lb. per sq. in. gauge with an equal quantity available at an exhaust pressure of 21 lb. per sq. in. gauge under conditions of reduced pass-out flow. The Allen turbine will run at 3,000 rpm and drive directly, an English Electric water-cooled alternator supplying power in parallel with existing machinery for an 11-kv, 50-cycle supply at 0.8 power factor.

FUNDAMENTALS OF FEEDING AND GATING will be dealt with in a course of six lectures arranged by the Poplar Technical College to commence on Thursday evening, May 11 (with the exception of May 25 the lectures will be given on each Thursday evening, 7 to 9 p.m., until June 22). The course will cater for foundry personnel who obtained their qualifications in foundry practice or patternmaking prior to 1957, and for those who, although holding no formal qualifications, have had at least 10 years' experience in foundry practice or patternmaking. The fee for the course is 10s. Further information may be obtained from the head of the mechanical engineering department of the College, Poplar High Street, London, E.14.

UNITED STEEL COMPANIES, LIMITED, Sheffield, have bought 108 acres of land near Coal Aston, near Sheffield, for development as an airstrip for use by the company's aircraft. Town planning permission has been received and an 800 yd.-long grass runway is being prepared, and is expected to be completed in the early summer. Customers and senior executives who arrive by air will be able to reach the group's head office in 15 minutes by car, and the steelmaking branches in the Sheffield area in about half an hour. At present the group has two full-time pilots and two aircraft based at Ringway Airport, Manchester. The first aircraft bought by them was in July, 1958, and is a four-seater Piper Apache. Last summer they also bought a Piaggio P166, a twin-engined aircraft which carries a pilot and five passengers and has a range of 1,000 miles.

EMPLOYEES at the aero-engine division of Rolls-Royce, Limited, at Derby, are being offered safety shoes of a recently-developed light-weight type on a weekly-payment plan. This is the result of a survey by doctors over two years on articles dropped by workers on their toes. The most common objects are grinding wheels, castings, boxes, steel plates, steel and iron blocks, dies, glass plates and spanners. The division's medical officer in a report on the investigations, says, "Most of these objects are of considerable weight and just over one-third of all foot injuries in a two-year period resulted in fractured bones." The report states, "Safety footwear has long been officially encouraged in the aero-engine division and is worn by many employees. However, the number of workers wearing safety footwear falls severely short of what it should be, as can easily be seen from the number of accidents."

Company News

FRED. TEMPERLY & SON, LIMITED—The company, a subsidiary of the Hepworth Iron Company (Engineering), Limited, has acquired for cash the share capital of Herbert Brooke & Company (Fireclay), Limited, Burnley.

BARROW HEPBURN & GALE, LIMITED, belting manufacturers, of London, S.E.1—The company's offer for ordinary shares of Samuel Barrow & Company, Limited, has now become unconditional, sufficient acceptances having been received.

C. A. PARSONS & COMPANY, LIMITED, engineers, turbine makers, etc., of Newcastle-upon-Tyne—The dividend is to be increased to 2s. 6d. (1s. 10½d.) per £1 share with a final of 1s. 7d. Group profit rose sharply to £5,267,063 (£3,478,690) and the net profit is £2,699,666 (£2,209,114).

ACROW (ENGINEERS), LIMITED, engineers and builders' plant manufacturers, of London, W.C.2—Second quarterly dividend of 12½ per cent. makes 25 per cent. to date on account of the year ending March 31, 1961, against the previous year's equivalent, adjusting for a one-for-10 scrip issue, of 22.72 per cent.

A. REYROLLE & COMPANY, LIMITED, manufacturing electrical engineers, of Hebburn (Co. Durham)—A final dividend of 6¼ per cent. makes 9¼ per cent. for 1960 on a capital doubled by a scrip issue. The previous year's equivalent was 8¼ per cent. After tax the net profit of £1,560,306 compares with £1,428,021.

HERBERT MORRIS, LIMITED, makers of cranes, handling equipment, etc., of Loughborough (Leics)—Announcing an interim dividend of 4 per cent., the chairman, Mr. Frank Morris states that the volume of orders has continued at a high level and the value of orders on hand is substantially higher than a year ago.

F. PERKINS, LIMITED, diesel-engine makers, etc., of Peterborough—Group profit, after charging all expenses including £498,352 extraordinary loss on scrapping machinery and equipment, is £1,246,577 (£1,301,882 for 10 months). Group net profit is £940,730 (£1,092,407). No final dividend is recommended.

JAMES N. CONNELL (HOLDINGS), LIMITED, scrap iron and machinery merchants, of Coatbridge (Lanarkshire)—Profit for the year to February 28, 1961, amounts to £151,027 (£134,174) and, after tax, the net balance is £68,416 (£72,046). A dividend of 15 per cent. is being paid, as forecast last November when the company became public.

BEYER, PEACOCK & COMPANY, LIMITED, locomotive engineers, steel, brass and iron founders, etc., of Manchester—Group profit for 1960 recovered to £321,864 (£72,092) and the dividend is maintained at 12 per cent. After tax of £143,283 (£73,682) the net balance is £178,581 (loss of £1,592). Group profit of the subsidiary the Anti-Attrition Metal Company, Limited, was £20,739 (loss £95,686).

RANSOMES SIMS & JEFFERIES, LIMITED, engineers and ironfounders, makers of agricultural machinery, etc., of Ipswich—Group profit, before tax, fell from £870,810 to £791,536 for 1960. The dividend is held at 7½ per cent. Sales and profits for 1960 suffered from the wet autumn, but since the end of the year have shown improvement, it is stated. After a lower tax charge, the net balance is £400,555 (£406,212).

VULCAN FOUNDRY, LIMITED—Holders of the £100,000 5 per cent. cumulative preference stock will be asked at a meeting in May to approve repayment of their capital at par. It is proposed to restore the authorized capital to its present figure of £1,000,000 and to make a scrip issue to the parent company, English Electric Company, Limited, of 100,000 £1 ordinary shares. English Electric will then own the entire issued capital of £945,097.

Stewarts and Lloyds Issue

The gross sum of £13,200,000 is to be raised by a rights issue of 6,000,000 £1 ordinary shares at 44s. each by Stewarts and Lloyds, Limited, steelmakers, tube manufacturers, etc. The offer is expected to be on the basis of two shares for every nine held on March 21, and net proceeds of £12,920,000 will be used to repay bank overdrafts of £4,711,305 at March 15, with the balance going towards capital expenditure.

The capital programme includes the major development of the Corby iron and steel works and tube works, which will increase capacity by nearly 500,000 ingot tons, at an estimated cost of about £35,000,000 over three to four years. In addition, there is outstanding some £20,000,000 on capital schemes authorized by the board for other sections. Retained profits and proceeds of the present operation will meet a large proportion of these requirements, but it is expected that further permanent or long-term capital will be needed in due course.

Unless present trading trends improve, profits for the current year will be lower than for the year to October 1 last, shareholders are expected to be told. In order to reduce the disparity between the interim and final dividends, it is intended to pay an interim of 5 per cent. in July on the present capital. Prospective final dividend is expected to be 10 per cent. on the increased capital of £33,000,000. The board is confident that the long-term prospects will be enhanced by the projected developments, which will reduce relative production costs and increase capacity.

CIBA United Kingdom, Limited

CIBA, Limited, Basle, manufacturers of pharmaceutical products, dyestuffs and synthetic resins have formed a company in the United Kingdom with an authorized share capital of £3,000,000 under the name of CIBA United Kingdom, Limited. The registered office of the company is at 96, Piccadilly, London, W.1. This company will act as the holding company for the CIBA interests in the United Kingdom by acquiring from CIBA, Limited, Basle, the issued share capital of its three wholly-owned United Kingdom subsidiary companies, namely CIBA Laboratories, Limited, manufacturers of pharmaceutical products, CIBA Clayton, Limited, a company selling dyestuffs, and CIBA (A.R.L.), Limited, manufacturers of foundry resins and adhesives, together with the controlling interest held by CIBA, Limited, Basle, in the Clayton Aniline Company, Limited, manufacturers of dyestuffs. It is intended that the new company will co-ordinate the activities of the CIBA group of companies trading in the United Kingdom. Dr. R. Kappeli (Swiss) has been appointed the chairman and Sir Arthur Vere Harvey, C.B.E., M.P., the managing director; Dr. A. Wilhelm (Swiss), Dr. A. Brunner (Swiss), Sir Joseph Napier, BT., and Mr. J. M. Baldock have agreed to join the board of directors of the company.

Mr. ALAN WILSON, assistant to the sales manager of Norton Motors, Limited, Birmingham, has died at the age of 57. He had been with the firm for over 30 years and was well known in motor-cycle competitive events.

Russian Castings Production

As part of its service to the world foundry industry, the British Cast Iron Research Association has undertaken the publication of a complete cover-to-cover translation of the monthly Russian foundry journal *Liteinoe Proizvodstvo*. It will appear under the title *Russian Castings Production* and will form part of the programme of Russian translations sponsored by the Department of Scientific and Industrial Research.

Liteinoe Proizvodstvo is the leading Russian monthly for foundrymen; in it practically all aspects of castings production are covered, from raw materials through melting processes and equipment, moulding sands and methods, casting and fettling, to the service behaviour of the finished product. While emphasis is placed on cast iron—grey, white, malleable, nodular and alloy—and steel castings, there are also articles dealing with non-ferrous and, particularly, light-alloy castings.

A fresh approach is found in many of the articles on day-to-day foundry problems and the papers on new techniques and on metallurgical investigations by the numerous technical institutes in the Soviet Union are bound to interest foundry engineers and metallurgists. The journal is illustrated and contains many detailed drawings of equipment. Apart from the specific technical information to be gained, a study of the new translation will enable readers to build up a picture of development of the Russian foundry industry.

The first edition of *Russian Castings Production* will appear in May, 1961, being the January, 1961, issue of *Liteinoe Proizvodstvo*. Publication will continue monthly, normally four months after date of the Russian issue. *Russian Castings Production* will contain approximately 56 pages printed letterpress, page size 11¼ in. by 8¼ in., and be enclosed in a two-colour cover. Subscription rates for 12 issues are £10 10s. in the United Kingdom and $35 (US) or £12 10s. outside UK. Single copies may be purchased at £1 10s. in UK or $5 (US) or £1 15s. outside UK. All enquiries and orders should be addressed to the Publications Officer, British Cast Iron Research Association, Bordesley Hall, Alvechurch, Birmingham.

Credit Measures to aid Exporters

Improvements in the method of financing and insuring British exports through the Exports Credits Guarantee Department were announced by Mr. Reginald Maudling, President of the Board of Trade, in the Commons last week. The improvements are in three parts, the first of which is that premium rates for ECGD insurance are being reduced; the main benefit of these reductions will be felt in those export markets where the highest rates are at present charged, and the effect will be to cut the total amount of premiums charged by about a quarter.

Secondly, ECGD is introducing an entirely new system by which the department will guarantee loans made for periods longer than five years by financial institutions in the City of London to "creditworthy overseas purchasers." Broadly speaking, these new guarantees of long-term loans are designed to help exports of large capital projects normally costing over £2,000,000, such as power stations, steel mills, pipelines, industrial plants, and ships.

Finally, ECGD has designed what it describes as a simplified "small exporter" guarantee. This will be available from the beginning of next month to all firms whose export turnover has been less than £10,000 a year in recent years. It will provide 90 per cent. cover against loss on all export business for a flat rate premium of 15s. per £100 insured.

Publications Received

Second Annual Conference Proceedings. Published by the British Investment Casters Technical Association, from 5, East Bank Road, Sheffield, 2; free of charge to members (extra copies: members 10s. 6d., non-members 21s.).

The bound proceedings of the second annual conference of BICTA held in London from May 16 to 18, 1960, make a comprehensive resumé of the whole event and will play a useful part in the world's documentation of this growing industry. Not only are all the five technical contributions reproduced in full, but there is a summary of the programme arrangements and social events included at the beginning, together with the Association's report, and edited versions of the discussions are attached at the end. The whole of the volume has been produced from accounts previously published in the FOUNDRY TRADE JOURNAL and this has served as a quite economical method of making up a permanent record of the event for members' bookshelves. The sole addition which the reviewer suggests might be included in the future volumes is an index of subjects and speakers, to supplement the contents list which already prefaces the publication.

Iron and Steel Industry in Europe, Second Half 1959. Published by the Organization for European Economic Co-operation (OEEC), 2 rue André-Pascal, Paris 16.

This brochure would command more interest if quicker publication could be effected, as although the main production figures for 1960 are already available, here and there in the publication under review appear statistics not readily found elsewhere. For instance, figures are given which disclose that whilst the consumption of pig-iron increased in steelworks in 1959 over the previous year by 7.8 per cent., in the iron foundries the gain was only 0.9 per cent. In the latter case it rose from 5,388,000 to 5,436,000 *tonnes*. This issue can be regarded as an interim publication and a further report is promised covering the trends for 1960.

House Organs

The Stantonian, Vol. 22, No. 5. Issued by the Stanton Ironworks Company, Limited, near Nottingham.

Though Mr. A. S. Wall retired from the services of the Stanton Ironworks Company, Limited, in 1952, his election to the presidency of the Wales & Monmouth branch of the Institute of British Foundrymen has been recorded in this issue with the publication of his portrait and a biographical note. The main article is on "Ironmaking at Stanton" and is one of the clearest and best-illustrated articles on the subject as prepared for laymen that the reviewer has so far seen.

Nickel Bulletin, January 1961. Issued by the International Nickel Company (Mond), Limited, Thames House, Millbank, London, S.W.1.

Abstracts from papers presented at a symposium on "Mechanical Properties of Intermetallic Compounds," held in Philadelphia in 1959, are a feature of the nickel and electrodepositions sections of this issue of the *Bulletin*. Other sections are concerned with nickel-containing non-ferrous alloys, cast irons, constructional steels and heat- and corrosion-resisting materials.

Personal

Mr. C. F. GRAFTON has resigned from the board of Leeds Fireclay Company, Limited.

Mr. C. C. BRITTEN has joined the board of W. E. Norton (Machine Tools), Limited.

Mr. J. A. BARKE and Mr. H. H. JEFFRIES have been appointed executive directors of the Ford Motor Company, Limited.

Mr. H. L. SATCHELL, director of manufacture with Associated Electrical Industries, Limited, has retired after 41 years' service with the firm.

Mr. PAUL CHAMBERLAIN, managing director of Roneo, Limited, has been elected to the board of Charles Churchill & Company, Limited.

Mr. R. L. BLAKE has been appointed to the new post of director of engineering at Brush Electrical Engineering Company, Limited, and has joined the board as executive director.

Appleby-Frodingham Steel Company, a branch of the United Steel Companies, Limited, announce that Mr. E. A. ATKIN, formerly assistant chief engineer, became deputy chief engineer on April 1.

Mr. E. A. ELMORE has joined the board of Gate Machinery Company, Limited, a wholly-owned subsidiary of B. Elliott & Company, Limited, and he has resigned his directorship of the parent company.

Mr. ALFRED BUCKLEY, head of the mathematics department at Huddersfield Technical College, has been appointed principal of Wakefield Technical College from September 1, in succession to Mr. G. N. BLAIR, who is retiring.

Mr. G. H. OXBORROW has been appointed secretary of the Lang Pneumatic Company, Limited, manufacturers of pneumatic-control equipment, Wolverhampton, in succession to Mr. G. E. JOWITT, who has relinquished that post on being elected a director.

Mr. E. L. MORGAN, formerly works metallurgist, has been appointed chief metallurgist of Workington Iron & Steel Company, a branch of the United Steel Companies, Limited. Mr. A. G. HOCK, formerly research manager, has been appointed metallurgical consultant at Workington.

Mr. & Mrs. "GUS" WALLIS of Weymouth recently celebrated their golden wedding. Married at All Saints' Wyke Regis, they went to live in Weymouth a few years later. For 48 years Mr. Wallis was employed at Vickers-Armstrongs, Wyke Regis, retiring four years ago after being foundry foreman for 28 years.

Mr. A. H. BUTLER, safety publicity officer to the United Steel Companies, Limited, and Mr. A. CLIFFORD, safety officer at the Appleby-Frodingham Steelworks, Scunthorpe, are to fly to Australia on a two-week tour, where they will study safety techniques and publicity at steelworks owned by the Broken Hill Proprietary Company.

Mr. D. L. ROPER has been appointed group sales manager for W. Williams & Sons (Holdings), Limited, and will be responsible for sales activities of Williams Alexandra Foundry, Limited, Dialoy, Limited, and Bronze Smelters, Limited, all of whom are in the non-ferrous foundry trade. The appointment commenced on April 1.

Mr. WALTER WOODFORD, secretary of the Institution of Production Engineers, has been invited to address the conference which is to run concurrently with the National Industrial Production Exhibition in Toronto, next month. He will speak at one of the plenary sessions, on "International Co-operation for Productivity in the Future."

Colonel JOHN G. PECKSTON, founder of J. G. Peckston, Limited, shipowners and brokers, Middlesbrough, has retired from the managing directorship, but retains his seat on the board as chairman. His son-in-law, Mr. NIGEL R. M. MOIR, and Mr. E. JONES have been appointed directors, and Mr. Moir becomes joint managing director with Mr. L. W. ORD.

Mr. JOHN ANTHONY WHITWOOD, a time-study man at Appleby-Frodingham Steel Company, Scunthorpe, was presented with the Royal Humane Society's testimonial at Scunthorpe Magistrates' Court on April 5 for saving the lives of two boys while holidaying at Cromer last August. He went to the help of the boys who got out of their depth in the sea, and with assistance brought them safely to shore.

An album illustrating his career has been presented to Mr. FRANK BYRNE, buyer for Birmingham brassfounders Pearson-Page-Jewsbury & Company, Limited, by his colleagues on his retirement after 42 years' service. At a ceremony at the company's Witton Works, Mr. Byrne also received a silver tray from the directors and a transistor radio set together with a set of travelling rugs from his colleagues.

Mr. NORMAN FOX has been appointed export manager of W. & T. Avery, Limited, scale and testing-machine manufacturers, Smethwick, in succession to Mr. S. A. MARTINDALE, who has retired after 26 years with the firm. Mr. Fox joined the company in 1935. Miss M. PARTRIDGE, who started with the firm on leaving school 43 years ago, and is one of the company's longest-serving employees, has retired.

Mr. JOHN L. DEFFENBAUGH, for two years manager of the Glasgow plant of Caterpillar Tractor Company, Limited, is to return to the United States in June to take up the appointment of assistant director of engineering at the firm's general offices in Peoria, Illinois. His successor as Glasgow plant manager, Mr. W. G. SCHULLER, has for the past year been assistant manager of the Peoria Plant, Caterpillar's largest manufacturing unit.

Mr. M. WASHBOURNE, general manager of the excavator division of Newton Chambers & Company, Limited, Thorncliffe, Sheffield, since the beginning of this year, has been appointed a director of NCK-Rapier, Limited, the sales organization for excavators and cranes made by Newton Chambers and Ransomes & Rapier Limited, and of Rhodes & Halmshaw, Limited, sheet-metal workers, Ossett, both subsidiaries of Newton Chambers & Company.

Hargreaves (Leeds), Limited, announce that Mr. GEOFFREY D. LAVERS has been appointed assistant managing director of the parent company of the Hargreaves group of companies, whose interests include fuels, road materials and transport. Mr. Lavers who joined Hargreaves in 1945, was appointed a director of the parent company in 1956. He is also chairman of William Pepper & Company, Limited, Hargreaves Motors, Limited, Reliance Garage Company (Brighouse), Limited, and Fred Chappell, Limited, subsidiaries of the Hargreaves group.

Mr. JOHN PHILLIPS, who was managing director of Tweedales & Smalley, Limited, textile-machinery makers, Castleton (Lancs), from 1950 until his retirement in 1958, has been promoted Officer Brother of the Order of St. John. He has been a member of the Order for over 50 years and was created a Serving Brother in 1956. He was instrumental in forming the Tweedales and Smalley St. John Ambulance Division in 1956, and was president when he retired. He is a

vice-president of the Rochdale Ambulance Association Centre and of the Rochdale Ambulance Corps.

Two new directors elected to the board of Alcan Industries, Limited, are Mr. A. A. BRUNEAU and Mr. R. J. MOYSE. Mr. Bruneau's career with the Aluminium, Limited, organization began in 1949 with the Aluminum Company of Canada, and he joined Alcan Industries (then Northern Aluminium) last year as secretary. Mr. Moyse, who was appointed chief financial officer and treasurer of the company last year, joined the organization in 1951 serving with Aluminium Securities, Montreal, and latterly as secretary/treasurer of the Indian Aluminium Company, Limited.

Precision foundry manager at Sterling Metals Limited, Nuneaton, Mr JOHN ARMSTRONG, leaves this month for America to take up an appointment in New York as a precision foundry engineer with Sims Casting Corporation. Mr. Armstrong joined Sterling Metals at their Coventry branch as an apprentice in the pattern shop 19 years ago and while with them obtained his National Certificate in Mechanical Engineering and the diploma of the National Foundry College with a distinction in non-ferrous work. He is senior vice-president of the Coventry section of the Institute of British Foundrymen.

Mr. W. R. OWEN, immediate past-president of the Yorkshire section of the Society of Instrument Technology, has been given responsibility for Cardiff and Manchester branches of Honeywell Controls, Limited, in addition to continuing as Birmingham branch manager. This follows the transfer of Mr. T. JACKMAN and Mr. R. ROBSON from Manchester and Cardiff respectively to head-office positions at Greenford. Mr. Jackman will now be field sales manager for heating, ventilating and air-conditioning controls in commercial buildings, and Mr. Robson will be market sales manager for the metal-processing industries.

Mr. W. C. M. MATTERSON, founder and managing director of Matterson, Limited, mechanical-handling engineers, Rochdale, retired on March 31, after 50 years in the engineering industry. At one time he was technical adviser to the production manager of the Austin Motor Company, Limited. He founded his own firm just after the first world war. Last year the University of Leeds conferred on him the honorary degree of M.Sc. in recognition of his services to British engineering. He is succeeded as managing director by his son, Mr. R. KELVIN MATTERSON, who has been joint managing director since 1957.

The Institution of Mechanical Engineers have awarded the 1960 James Clayton Prize to WILLIAM KER WILSON, M.SC., D.SC.(ENG.)(LOND.), PH.D., WH.EX., M.I.MECH.E., for his contributions to mechanical engineering science, including work on torsional and general vibration, engine balance, crankshaft design, the special problems of vibration associated with aero gas-turbines and gyroscopic loading on gas-turbine rotors; and for his many technical papers and outstanding text books on these subjects. The prize is drawn from the Clayton Trust Fund, and represents one-quarter of the annual income of the fund (nearly £6,500 each year).

Mr. JAMES A. MCINTOSH has now taken over his duties as full-time instructor of foundry practice in the Metallurgy Department of the Technical College at Coatbridge, Lanarkshire. Mr. McIntosh, who served his apprenticeship as a patternmaker with M. Cockburn & Company, Limited, Falkirk, was afterwards employed with Forth & Clyde & Sunnyside Company, Limited, and subsequently became foundry manager with Smith & Wellstood, Limited, Bonnybridge. He joined the firm of Lane & Girvan, Limited, Bonnybridge, 12 years ago as works manager, the position he has just left to go to Coatbridge. Mr. McIntosh is an associate member of the Institute of British Foundrymen and of the Institute of Works Managers, and is a past-president of Falkirk section of the Scottish branch of the IBF. He has had technical papers published in Britain, India and America.

Recent Wills

PIGGOT, W. J., a former director of Laporte Industries, Limited, London, W.1 ... ... £87,042

HOWE, PROF. G. W. O., Emeritus Professor of Electrical Engineering, Glasgow University £35,696

WEIR, SIR CECIL MCALPINE, chairman of International Computers & Tabulators, Limited, London, W.1 £36,687

ATHEY, MAJ. J. W., chairman of Fordath Engineering Company, Limited, analytical chemists and metallurgists, of West Bromwich (Staffs) £52,051

WEAVER, H. T., a former president of the Birmingham, Coventry and West Midland branch of the Institute of Foundrymen £20,313

KAY, C. B., former works manager and director of the Sunbeam Motor Company, Limited, Wolverhampton, and later of George H. Alexander Machinery, Limited, Birmingham £72,260

GODBER, LEONARD, a local director and general manager (services) of Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield, with which company he served 37 years £9,692

PROBYN, F. E. C., chief mechanical engineer at the Ebbw Vale Works of Richard Thomas & Baldwins, Limited, since 1958, and a past president of the Ebbw Vale Metallurgical Society £8,381

BRUCE-GARDNER, SIR CHARLES, chairman of the British Iron and Steel Corporation, Limited, and of the British Steel Corporation, Limited, deputy chairman of the Steel Company of Wales, Limited, and a director of Consett Iron Company, Limited £419,335

PARKER, WILLIAM ERNEST, a founder director of British Rolling Mills, Limited, Brymill Steelworks, Tipton (Staffs), and a former director of the Audley Engineering Company, Limited, valve manufacturers, of Newport (Shropshire) £50,180

BROWN, MRS. ALICE SIDNEY GEORGE, a co-founder with her husband, the late Mr. S. G. Brown, of S. G. Brown, Limited, precision instrument makers, of Watford, and a former director of the Telegraph Condenser Company, Limited £311,140

ATKINSON, ROBERT MORTON, chairman of Sulzer Bros. (London), Limited, mechanical engineers, London, W.C.1, and a director of Richardsons, Westgarth & Company, Limited, and George Clark & North Eastern Marine (Sunderland), Limited £62,089

ICKE, S. C., a former chairman and managing director of Brooke Tool Manufacturing Company, Limited, Birmingham, who retired in 1939. He was also a former director of Lister Tools, Limited, Wolverhampton, and of Arthur Scrivener, Limited, machine tool manufacturers, of Birmingham ... £491,678

VERULAM, LORD, chairman of Enfield Rolling Mills, Limited, and of Engineering & Lighting Equipment Company, Limited, and Sternol, Limited, former managing director of Enfield Cables, Limited, a director of the London Committee of the District Bank, Limited, and member of the council of the Industrial Welfare Society £17,398

"Apprentice of the Year" Competition

Twenty-on-year-old Jean Nanette Lowe, an employee of Guest Keen & Nettlefolds, Limited has been chosen as one of three apprentices to represent Birmingham in the "Apprentice of the Year Competition" organized by Birmingham Junior Chamber of Commerce for its national body. Jean, who was winner in the commercial section of the local final was the only girl entrant. The technical section was won by David Sheeham (23), who is employed at Birmid Industries, Limited, Smethwick, and Michael David Greatrex (21), of Erdington, Birmingham, won the craft section. The three will go forward to the Regional finals at Coventry on April 22. The national final will be held in Birmingham on June 1. H.R.H. The Duke of Edinburgh will present the finals awards.

Raw Material Markets

Iron and Steel

Pig-iron production is maintained at high levels and consumers of all grades are provided with adequate supplies for consumption and stock requirements. The steelworks continue to absorb large tonnages of basic pig-iron, the proportion being higher than that normally utilized owing to the fluctuating supply of suitable scrap. The ironfoundries also are well supplied with pig-iron, and have no difficulty in acquiring all the grades they need.

The engineering and speciality foundries maintain a substantial demand for the low phosphorus irons, and producing furnaces can cope quite easily with present demands, while hematite makers are also able to satisfy the needs of these foundries for supplies. The call for refined irons is met satisfactorily. High phosphorus pig-iron is also plentiful, and no difficulty is experienced in obtaining the required supplies by the foundries using this grade, including the light, jobbing, textile and some of the engineering foundries.

Overall, the current demands for pig-iron do not absorb outputs fully, and most producers could step up deliveries appreciably if required to do so, as apart from the tonnages which have to be placed into stock, full productive capacity at many of the furnaces is not being obtained at present. With the easy supply position, the foundries are carrying only meagre stocks.

Substantial outputs of high-quality castings continue to be produced by the engineering and speciality foundries, and those catering chiefly for the motor vehicle industry are the most heavily employed. The present schedules of delivery enable most of these foundries to maintain a full working week. Machine-tool makers, heavy electrical and power plant manufacturers, agricultural implement makers, steelworks and other trades are also specifying freely for castings, and these requirements keep the foundries supplying them engaged at good levels.

Many of the light foundries have difficulty in improving on the moderate outputs they have been obtaining for some time past, particularly those producing castings for the domestic utensil trade. Business from this source fluctuates, and is not sufficient to keep plants employed anywhere near capacity levels. The light foundries supplying castings to the building trades are receiving better support, but most of the jobbing as well as the textile foundries could undertake more work.

The supply of scrap is generally sufficient for most of the foundries, although arisings of the heavier and better types of cast-iron scrap are none too plentiful. Foundry coke deliveries are satisfactory, and ganister, limestone, and firebricks are obtained without difficulty.

The re-rollers continue to obtain reasonably good outputs, although the current demands show a decrease on previous requirements, apart from reinforcing rods and bars which are in heavy request. The call for small bars and light sections has shown a decline, and although the demands for steel strip and bright drawn bar have shown some improvement recently it has not yet reached former levels.

The re-rollers are well provided with mild steel semis. Most of them have fairly good stocks, on account of which demands from home steelworks have and are still being curtailed, and orders for fresh supplies are only being placed as these stocks are liquidated. Home steelworks have tonnages of mild steel semis to spare, but for carbons and alloy steel billets the supply position is not so easy. There is no difficulty in disposing to the re-rollers all arisings at the steelworks of suitable re-rolling defectives and crops.

Non-ferrous Metals

Tin markets in London, Singapore, and New York experienced wild price fluctuations last week. Nevertheless, the general level of demand has been impressive and London enjoyed some of the heaviest trading in the metal that has been seen for a very long time. Indeed, both cash and three months metal prices were leaping ahead daily by as much as £10 a ton. The strength of the market was obviously too much for the buffer stock manager to cope with. But once the price of cash metal had reached £845 a ton and three months metal had gone above £850 a ton, the buffer stock manager took action and, it is estimated, disposed of some 500 tons from his stockpile.

The fact that the buffer stock manager did take action was sufficient to deter potential consumers and the market became nervous and a good deal weaker with the result that the quotation for cash fell to around £835 a ton and that of three months metal to £842 a ton. The market in Singapore went through the same gyrations and after rising to a level £35 a ton higher than the London quotation fell back sharply.

The position and prospects for the metal remain exceedingly bright and there is little doubt that the buffer stock manager will have to intercede again to keep the price from shooting out of sight. In this connection it must be remembered that there is no more than 10,000 tons in the buffer pool with which to steady the market, and too strong a hand in the early part of the year to keep the price down and steady may result in there soon being little or no tin left with which to regulate the price later in the year.

The US market has been buoyant and the price, after going ahead to not far short of $1.10 a pound has come back to fractionally more than $1.07 a pound. The US market continues bright, as the canning industry foresees a high level of demand this year and is worried about the possibilities of a shortage of tin. The same reasons have brought the tinplate industry into the market and it is thought that part of the fierce price rise last week was due, in part at any rate, to US steel companies purchasing tin in London rather than from their usual source in the East. An official of the US Government body responsible for stockpiled metals said that the disposal of tin from the US stockpiles is "extremely unlikely."

Copper is a much improved market on both sides of the Atlantic and, despite the statistical surplus of copper, it is believed that most producers are virtually sold out for the next two months. All these factors have led to the rumour that there will soon be an increase in the custom smelter price which, at present is the same as the producers' at 29 cents a pound.

The expectation of an increase in the US custom smelter price resulted in firm London markets but prices have not varied much and the New York market will probably be a strong influence on London in the weeks ahead.

Lead has been a routine market in London with the price fluctuating narrowly around £67 10s. a ton. In the US the market is quietly steady and the price unchanged at 11 cents a pound.

Zinc in London has risen and fallen with the copper price. In general, sellers and buyers are evenly matched and the price is fairly steady around £84 a ton. In the US the market is maintaining its improvement and the East St. Louis spot quotation is firm at 11½ cents a pound.

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Imports and Exports of Iron and Steel in February

The following tables, based on Board of Trade returns, give figures of imports and exports of iron and steel in February this year. Totals for the first two months of 1960 and 1961 are also included.

Total Exports of Iron and Steel

Destination.	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Malta	245	1,825	564
Sierra Leone	1,372	783	3,616
Ghana	870	3,125	2,703
Nigeria	4,381	10,883	15,696
Union of South Africa	7,277	12,103	12,751
South-West Africa	1,518	124	4,229
Rhodesia and Nyasaland	2,930	3,246	6,424
Tanganyika	1,290	1,502	3,933
Kenya	2,642	3,587	7,046
Uganda	69	315	489
Mauritius	152	464	391
Bahrein, Qatar, and Trucial States	950	1,546	2,452
Kuwait	1,600	672	2,297
India	30,146	40,008	50,185
Pakistan	2,690	14,212	6,922
Singapore	2,440	2,491	4,491
Malaya	2,152	3,206	4,615
Ceylon	2,129	9,621	4,769
British North Borneo	220	935	536
Hongkong	4,874	11,886	10,427
Australia	13,889	30,535	38,002
New Zealand	29,583	15,433	55,596
Canada	9,476	39,117	22,164
Jamaica	1,541	4,076	3,576
Trinidad	3,468	6,843	7,001
British Guiana	779	1,222	1,467
Other Commonwealth countries	2,294	4,753	4,112
Eire	6,472	10,259	13,781
Soviet Union	3,893	3,460	5,465
Finland	4,078	6,449	7,697
Sweden	15,028	40,332	31,836
Norway	10,031	23,425	19,956
Denmark	8,843	17,982	16,399
Poland	2,244	2,815	2,520
Western Germany	9,477	35,017	16,317
Eastern Germany	1,440	6,764	3,310
Netherlands	10,113	24,403	18,992
Belgium	2,863	7,911	3,473
France	276	1,207	1,545
Switzerland	1,327	2,345	3,355
Portugal	2,773	2,622	4,124
Spain	1,210	2,829	3,131
Italy	5,353	7,783	10,125
Austria	326	612	977
Yugoslavia	983	1,906	5,093
Greece	4,347	3,127	8,226
Turkey	1,878	357	3,923
Netherlands Antilles	123	1,294	174
Portuguese East Africa	131	883	360
Egypt	863	3,679	5,091
Libya	822	1,916	1,505
Sudan	747	2,176	2,017
Israel	1,241	5,214	4,252
Saudi Arabia	52	98	229
Iraq	1,503	5,538	14,309
Iran	1,311	15,308	3,521
Burma	564	1,931	809
Thailand	448	1,934	1,219
Indonesia	463	4,663	1,764
China	2,773	13,804	5,672
Japan	8,585	11,137	21,877
Philippine Republic	116	2,132	896
USA	6,888	62,493	14,364
Cuba	257	1,558	491
Mexico	284	842	430
Colombia	982	2,400	2,994
Venezuela	1,020	8,244	2,842
Ecuador	386	494	593
Peru	609	1,087	1,413
Chile	332	446	648
Brazil	1,330	3,424	1,756
Uruguay	1,197	1,911	1,471
Argentina	11,186	18,782	16,983
Other foreign countries	10,843	10,864	14,764
TOTAL	278,988	610,370	579,143

Total Imports of Iron and Steel

From	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Union of South Africa	4,040	9,584	6,410
Rhodesia and Nyasaland	1,724	1,500	8,077
Canada	12,677	5,804	36,553
Other Commonwealth countries and Eire	5,146	6,515	10,270
Soviet Union	1,239	7,607	4,794
Sweden	4,990	7,228	9,286
Norway	10,603	22,120	22,358
Poland	80	3,086	221
Western Germany	2,106	26,443	8,145
Netherlands	7,921	30,114	15,086
Belgium	5,579	11,189	10,224
Luxembourg	3,033	1,661	5,992
France	2,784	9,327	5,631
Italy	54	2,345	208
Austria	505	2,038	807
Japan	696	1,175	1,728
USA	696	1,175	1,728
Other foreign countries	1,118	5,094	1,832
TOTAL	65,395	163,636	150,443
Iron and steel scrap and waste fit only for the recovery of metal	1,664	23,606	3,289

Exports of Iron and Steel, by Product

Product.	Month ended Feb. 28.	Two months ended February 28.	
	1961.	1960.	1961.
	Tons.	Tons.	Tons.
Pig-iron	9,624	44,416	17,327
Ferro-columbium (niobium)	2	21	7
Ferro-tungsten	90	208	175
Other ferro-alloys	422	1,537	716
Ingots, blooms, billets, slabs, sheet bars (incl. tinplate bars), and similar primary forms	3,315	13,302	4,423
Pieces roughly shaped by forging	140	113	340
Iron bars, rods, angles, shapes, and sections	89	346	353
Steel bars, rods, angles, sections, and shapes	56,430	111,475	121,846
Iron plates and sheets	78	147	227
Universal plates	1,319	3,526	2,034
Steel plate, 3 mm. and under 4.5 mm. thickness	2,716	5,813	5,671
Ditto, 4.5 mm. or more in thickness	23,030	50,460	58,913
Blacksheets and blackplate	31,456	53,547	56,115
Hoop and strip	10,442	16,335	21,922
Tinplate	44,137	107,197	77,426
Decorated tinplate	589	513	1,162
Galvanized sheets	7,422	11,131	13,000
Other (incl. tinned sheets, terneplate, and ternesheets)	2,441	5,856	6,795
Railway and tramway construction material	18,727	19,482	42,472
Wire rods of steel (incl. alloy steel)	5,931	11,632	9,823
Wire	12,375	19,675	23,227
Tubes, pipes, and fittings	48,213	133,638	115,169
TOTAL	278,988	610,370	579,143

PRELIMINARY NEGOTIATIONS have been concluded for the merger of the two brassfounding businesses of Tonks (Birmingham), Limited, Moseley Street, Birmingham, 12, and Walter Rowley, Limited, Allesley Street, Birmingham, 6.

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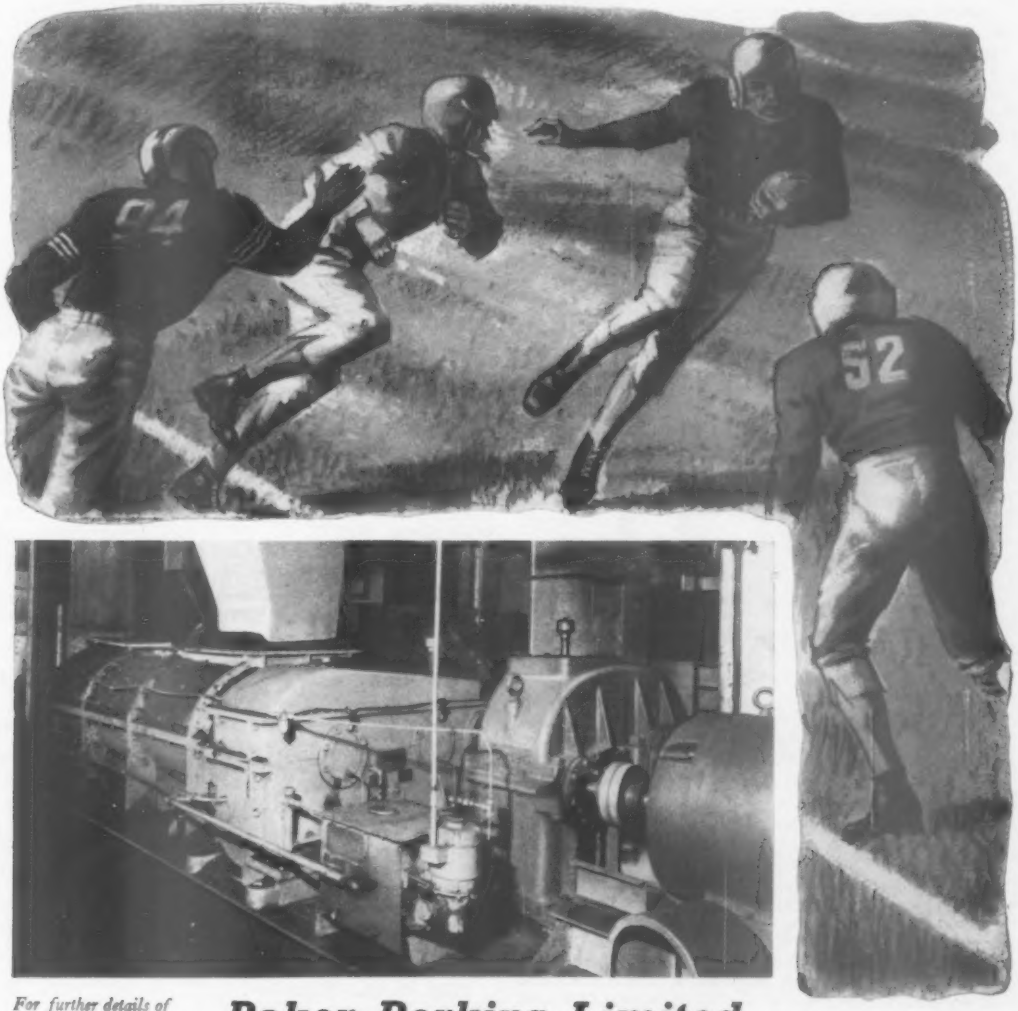

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Tel. Jarrow 897124

BPF9

Current Prices of Iron, Steel, and Non-ferrous Metals

(Basis prices, delivered unless otherwise stated)

April 19, 1961

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2, 10-ton lots or over Middlesbrough, £21 17s. 0d.; Birmingham, £21 9s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.40 per cent. P 10-ton lots or over, £23 5s. 0d., delivered Birmingham £23 10s. 0d., delivered Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 6s. 6d. South Zone, £25 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.; North Zone £26 6s. 6d.; South Zone, £26 9s. 0d.

Hematite.—Si less than 2 per cent, S. & P. over 0.03 to 0.05 per cent., 10-ton lots or over; N.-E. of England (local iron), £23 19s. 0d.; Scotland (Scotch iron), Zone S.1, £24 5s. 6d.; Sheffield, £25 9s. 0d.; Birmingham, £25 13s. 0d.; Wales (Welsh iron), £23 19s. 0d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leicestershire in 10-ton lots or over.

FERRO-ALLOYS

(per ton unless otherwise stated, delivered)

Ferro-Silicon (6-ton lots and over).—45 per cent. Si, £45 0s. 0d. to £48 0s. 0d., scale 15s. 0d. per unit, lumpy, 75 per cent. Si, £62 0s. 0d. to £66 10s. 0d., scale 15s. 0d. per unit, lumpy.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s.10d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 9s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 12s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over, lumpy).—4/6 per cent. C, £81 10s. 0d. to £84 10s. 0d., basis 60 per cent. Cr scale 27s. 0d. to 28s. 6d. per unit; over 6 per cent. C, £79 0s. 0d. to £82 10s. 0d., basis 60 per cent. Cr, scale, 27s. 0d. to 28s. 6d. per unit; 2 per cent. C,* 1s. 8d. to 1s. 11d. per lb. Cr; 1 per cent. C,* 1s. 8d. to 1s. 11½d. per lb. Cr; 0.15 per cent. C,* 1s. 9½d. to 2s. 0½d. per lb. Cr; 0.10 per cent. C,* 1s. 9¾d to 2s. 0¾d. per lb. Cr; 0.06 per cent. C,* 1s. 11d. to 2s. 1d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 6s. 10d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free £275 0s. 0d.; 96/98 per cent., £285 0s.0d.

Ferro-columbium.—65/67 per cent. Cb + Ta, 19s. 9d. per lb., Cb + Ta.

Ferro-manganese (Standard).—78 per cent., £58 10s. 0d.

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Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., 100 tons and over, £31 15s. 6d.; tested, 0.08 to 0.33 per cent. C, 100 tons and over, £32 5s. 6d.; hard (0.41 to 0.60 per cent. C), 50 tons and over, £33 17s. 0d.; silico-manganese, 50 tons and over, £42 16s. 6d.; free-cutting, 50 tons and over, £35 4s. 6d. SIEMENS MARTIN ACID (50 tons and over): Up to 0.25 per cent. C, £40 11s. 0d.; silico-manganese, £43 4s. 0d

Billets, Blooms, and Slabs for Forging and for Stamping (50 tons and over).—BASIC: Soft, up to 0.33 per cent. C, £37 0s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £38 2s. 6d.; acid, up to 0.25 per cent. C, £41 14s. 0d.

FINISHED STEEL

Heavy Plates and Sections (50 tons and over).—Ship plate (N.-E. Coast), £40 7s. 0d.; boiler plates (N.-E. Coast), £42 17s. 0d.; floor plates (N.-E. Coast), £41 16s. 0d.; angles (N.-E. Coast), £38 1s. 6d.; joists (N.-E. Coast), £37 17s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats 5 in. wide and under, untested soft basic, 50 tons and over, £39 1s. 0d.; under 10 tons to 4 tons, £40 18s. 6d.; under 4 tons to 2 tons, £41 3s. 6d.; hoop and strip, coils, 100 tons and over, £38 0s. 0d.; uncoated strip mill coils, hot rolled, under 3 mm. to 12g., 25 tons to under 50 tons, £43 16s. 0d.; black sheets (hand mill), 24g., 10 tons and over, £57 14s. 6d.; galvanized corrugated sheets, 24g., 10 tons and over, £67 11s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £66 7s. 0d.; nickel-chrome, £97 1s. 0d.; nickel-chrome-molybdenum, £109 14s. 0d., in lots of 25 tons and over.

NON-FERROUS METALS

Copper.—Cash, £229 0s. 0d. to £229 5s. 0d.; three months, £230 15s. 0d. to £231 0s. 0d.; settlement, £229 5s. 0d.

Copper, Tubes, etc.—Solid-drawn tubes, 2s. 2½d. per lb.; rods, 244s. 6d. per cwt. basis; 20 s.w.g., 279s. 6d. per cwt.

Tin.—Cash, £838 10s. 0d. to £839 0s. 0d.; three months £847 10s. 0d. to £848 0s. 0d.; settlement, £839 0s. 0d.

Lead (Refined Pig).—Second half April, £67 2s. 6d. to £67 5s. 0d.; second half July, £68 5s. 0d. to £68 7s. 6d.; settlement, £67 5s. 0d.

Zinc.—Second half April, £83 15s. 0d. to £83 17s. 6d.; second half July, £83 17s. 6d. to £84 0s. 0d.; settlement, £83 17s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £121 5s. 0d.; rolled zinc (boiler plates), all English destinations, £120 0s. 0d.; zinc oxide (Red Seal); d/d buyers' premises, £97 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 10d. per lb.; sheets to 10 w.g., 200s. 0d. per cwt.; wire, 2s. 8½d.; rolled metal, 200s. 0d. per cwt.

Brass (Brazing).—BS1400, B3, £179; B6, £227.

Brass (High Tensile).—BS1400, HTB1, £197; HTB2 £214; HTB3, £232.

Gunmetal.—BS1400, LG2, £223; LG3, £233; G1, ½%, £296; G1, 1%, £286.

Phosphor Bronze.—BS1400, PB1 (AID released), £313 BS1400, 90/10/1, £302.

Leaded Phosphor Bronze.—BS1400, LPB1, £244.

Phosphor Bronze Strip, etc.—Strip, 291s. 6d. per cwt.; wire, 4s. 1½d. per lb.; rods, 3s. 4d.; tubes, 3s. 4d.; chill cast bars, solids 3s. 4d.; cored 3s. 5d. (CHARLES CLIFFORD, LIMITED).

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10½d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 3½d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 2½d. All prices are net.

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Advertisements (accompanied by a remittance) and replies to Box Numbers should be addressed to the Advertisement Manager, Foundry Trade Journal, John Adam House, 17/19, John Adam Street, Adelphi, London, W.C.2. If received by first post Monday advertisements can normally be accommodated in the following Thursday's issue.

SITUATIONS WANTED

FOUNDRY FOREMAN / MANAGER, with comprehensive experience of medium heavy jobbing, grey and high duty irons, cupola and sand control, quotations, pattern design, methods, seeks post offering scope for initiative. Box FF710, FOUNDRY TRADE JOURNAL.

FOUNDRY TECHNICIAN (24) requires progressive position with malleable foundry in West Midlands. Experienced all aspects of malleable industry. Ex. National Foundry College, G. & G. Foundry Practice, Metallurgy, Pattern-making. Box FT711, FOUNDRY TRADE JOURNAL.

DRAUGHTSMAN, Qualified Pattern-maker, with foundry and machine shop experience, First Class C. & G.L.I. Full Technological Certificate in Pattern-making and Foundry Practice, seeks technical position, preferably Birmingham or Midland area. Box DQ713, FOUNDRY TRADE JOURNAL.

AUSTRALIAN (40), M.I.B.F., arriving U.K. shortly, wide practical and technical experience in ferrous and non-ferrous metals. Past 7 years executive positions. At present in Far East. Seeks permanent position, with housing assistance. Box AM704, FOUNDRY TRADE JOURNAL.

PLANT ENGINEER (41) seeks new post in large Modern Mechanised Foundry. Good background and experience embracing installation, maintenance, planning and development. Qualifications include: M.I.Plant E., M.I.B.F. Salary required: £2,000 p.a. Housing assistance, car, etc. Box PE671, FOUNDRY TRADE JOURNAL.

SITUATIONS VACANT

BLACKHEART Malleable Foundry in West Midlands requires an experienced FOUNDRYMAN to organise and operate a mould inspection and quality control section. Experience in malleable foundries desirable, but not essential. Box BM709, FOUNDRY TRADE JOURNAL.

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required by Steel Foundry producing wide range of castings in carbon and alloy steel. Applicants should have practical steel founding experience. This is a staff position. A Pension Scheme is in operation. Canteen facilities are available and an active Social Club is attached to the Works.

Applications should be in writing and give details of age, education, experience, etc., to:

The Foundry Manager,
THE NORTH BRITISH STEEL FOUNDRY LTD.
Balbardie Steel Works,
Bathgate, West Lothian, Scotland

SITUATIONS VACANT—*contd.*

CHEMIST and Junior required for laboratory analysis of non-ferrous metals, now S.E.1, later Woolwich. Write GENERAL WORKS MANAGER, A. COHEN & CO. LTD., Rothsay Street, S.E.1.

SALES REPRESENTATIVE required by large repetition Iron Founders, North Midlands. Previous experience in engineering or foundry trades essential, good prospects leading to executive position, car provided, pension scheme. Write stating age, experience and salary required. Box SR679, FOUNDRY TRADE JOURNAL.

Advertisers whose announcements appear under a box number are urged to acknowledge, however briefly and informally, all replies received. This particularly applies to advertisements under "Situations Vacant"; serious inconvenience and, sometimes, real hardship can be caused to applicants who receive no indication even of the safe receipt of their communication. Failure to acknowledge replies can also reflect on the good faith of this journal, which is responsible for their onward transmission. If it is desired to maintain anonymity, an acknowledgement on plain paper, quoting the relevant box number, is all that is necessary.

APPLICATIONS are invited from young men between the ages of 23 and 25 for the position of ASSISTANT to the Foundry Manager in a grey iron foundry in South East Lancashire. Candidates must have good practical and technical knowledge of all phases of grey iron foundry practice, including loam moulding. The post, which carries staff status, is progressive and offers scope for promotion. Box AA708, FOUNDRY TRADE JOURNAL.

ASSISTANT FOUNDRY MANAGER

REQUIRED for Malleable Iron Foundry in SOUTH AFRICA with interests in other countries. Applicants should have a sound basic knowledge of malleable cupola practice and be between 25 and 40 years of age.

TECHNICAL ASSISTANT

also required with knowledge of chemical analysis and general malleable foundry practice. Applicants should be between 21 and 30 years of age.

Please reply giving details of past experience and positions held to our LONDON OFFICE.

Both above positions carry good salaries and five years' contract to men with suitable experience.

London Office Address
S.A.P.I.M.A.,
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SITUATIONS VACANT—*contd.*

CENTRAL SCOTLAND. Established Foundry requires FOREMAN MOULDER to control production of Alloy and Grey Iron castings up to 2 tons in green, dry and CO, sand. Staff position with pension scheme etc. State experience and salary required. Box CS674, FOUNDRY TRADE JOURNAL.

BRITISH manufacturers of bonding materials for foundry sands wish to strengthen their representation in the Greater London area and invite applicateions from men of experience and integrity who seek a tough, but rewarding career in selling. The successful applicant will be provided with a car, must reside in the area and will be expected to join the Company's contributory Pension Scheme. Details of educatuion, career to date and present salary will be treated with strict confidence if sent to Box BM706, FOUNDRY TRADE JOURNAL.

REPRESENTATIVES FOR GREY IRON CASTINGS

TWO Representatives (one for Midlands and the other for Southern Counties) required by old established, grey iron foundry producing small machine, bench and floor castings up to 1 ton in Grades 12, 14 and 17. Previous sales and technical experience essential. Car provided. Other advantages include non-contributory pension scheme.

Please write giving full particulars of career to:—

The Personnel Manager,
ALFRED ELLISON LIMITED,
Perry Barr,
Birmingham 22B.

COMPANY producing sand and silica products to specification requires personnel to take charge of the laboratories controlling production and chemical supplies. The plants are located in the Midlands and South of England. Men aged 25-40, with experience and sound technical education up to degree standard are required. The salary paid will depend on qualifications and experience. The men appointed will be responsible to the central technical department at Redhill, where a period of training is envisaged. Apply to RESEARCH MANAGER, BRITISH INDUSTRIAL SAND LTD., Holmethorpe, Redhill, Surrey.

FOUNDRY MANAGER required by Steel Founders and Engineers situated on the North East Coast. Applicants who will have full control must have first class practical and technical experience of the production of castings up to 20 tons by floor, machine and sand-slinging methods. Good experience of sand control is also essential. A contributory staff pension scheme is in operation and a house is available. A good salary will be paid. Applicants should state age and full details of training, experience and positions held, which will be treated in the strictest confidence. Letters should be addressed: DIRECTOR, WOLSINGHAM STEEL COMPANY LIMITED, Wolsingham, Co. Durham.

SITUATIONS VACANT—*contd.*

AGENTS required for Non-ferrous Foundry. Sand and gravity die capacity available immediately. Commission basis. Box AR705, FOUNDRY TRADE JOURNAL.

COREMAKER. An experienced Coremaker for large cores required for foundry in West Riding of Yorkshire. Position offers scope for man about 30-40 years with initiative and drive. Give details of experience, age, salary required. Reply to THE MANAGER, Box CM676, FOUNDRY TRADE JOURNAL.

CENTRAL SCOTLAND. Established Foundry requires FOREMAN COREMAKER. Must be experienced in production of Cores in Oil, CO_2, Shell, etc. for production quantities and heavy castings up to 2 tons. Staff position with pension scheme, etc. State experience and salary required. Box EF675, FOUNDRY TRADE JOURNAL.

METALLURGIST required for Australia to control Chem./Met. laboratory and responsible quality deLavaud process. Degree or Diploma. Good knowledge cast iron and hot blast furnace operation. Passages paid. Assistance housing. Salary according to qualifications not less than £A1,750. Box MR703, FOUNDRY TRADE JOURNAL.

METALLURGIST required for large H.F. melting plant shortly to be commissioned in Northern England. Duties will include full technical responsibility for melting and laboratory control. A trained mind of A.I.M. level with practical experience is sought to join a young and hard working team in a small progressive Company. Good basic salary. Pleasant district and working conditions. Staff Pension Scheme. Canteen facilities. Holiday commitments honoured. Interviews can be arranged in Sheffield. All reasonable applications will be acknowledged. Write fully to Box MR712, FOUNDRY TRADE JOURNAL.

TECHNICAL REPRESENTATIVE (Castings) required for London and Home Counties north of the Thames. Experience in similar capacity, or foundry/mechanical engineering background necessary. Write to J. D. S. TOWNSHEND & CO. LTD., Founders' Representatives, 12, South Drive, Banstead, Surrey.

SKILLED FALSE-CORE MOULDER required, London, W.9, for small shop producing engineering, art, castings in lead, bronze, aluminium. Must be able to mix own alloys, experience in lead-burning, brazing would be advantageous. Please state experience and salary required. Box SF699, FOUNDRY TRADE JOURNAL.

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AN immediate vacancy exists for a first class Representative to operate an area covering Birmingham and the Midlands.

The minimum qualification is at least five years' experience selling steel castings of all types and a wide connection in the Industry. A knowledge of Foundry Practice would be desirable.

Applications are invited from candidates 30-40 years old who should be resident in the Area.

The appointment will be on the Monthly Staff. A Pension Scheme is in operation, a Company car will be provided and a generous salary offered to the successful applicant.

Applications, marked "Confidential," giving details of career, should be sent to the Director, Wolsingham Steel Company Limited, Wolsingham, Bishop Auckland, Co. Durham.

MACHINERY WANTED

WANTED, Shotblasting Booth, approximately 15 ft. × 10 ft. with Dust Arrester, Compressor if available. Box SB701, FOUNDRY TRADE JOURNAL.

WANTED, Tilghman Wheelabrator, condition immaterial. Box TW702, FOUNDRY TRADE JOURNAL.

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TWO Electrogenerator Sand Blast Cabinets, 5 ft. × 3 ft. × 3 ft. with air receivers and compressors by Broom & Wade. One horizontal centrifugal casting machine, unused. One Electromagnates magnetic separator, 6 in. drum. Apply TYNESIDE LIGHT ALLOYS LTD., Wellington Road West, Dunston-on-Tyne. Phone 605031.

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460 ft.
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LIMITED NUMBER of firms interested in German "Kollenguss" (brass gravity diecasting) ideal cocks, valves, water fittings, etc., requiring "know how" and A-Z of process. Contact Box LI677, FOUNDRY TRADE JOURNAL. All replies vetted.

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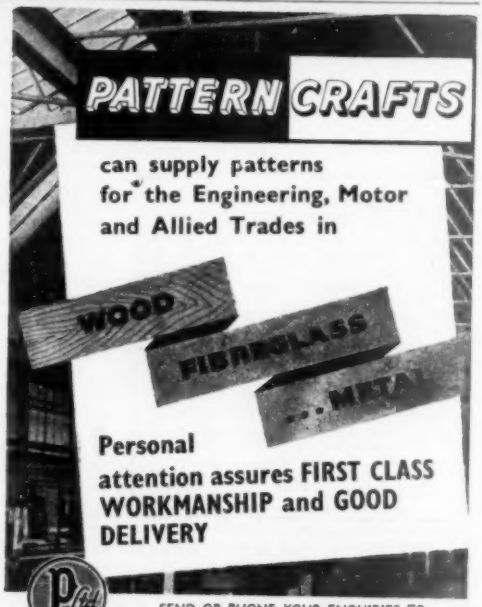
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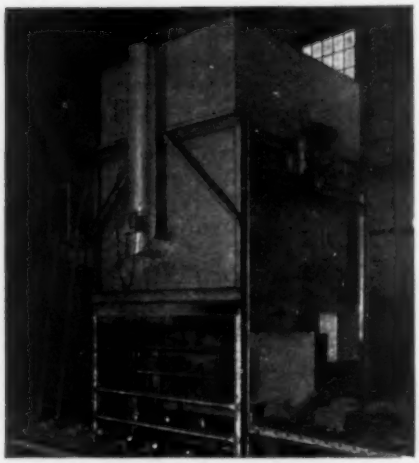

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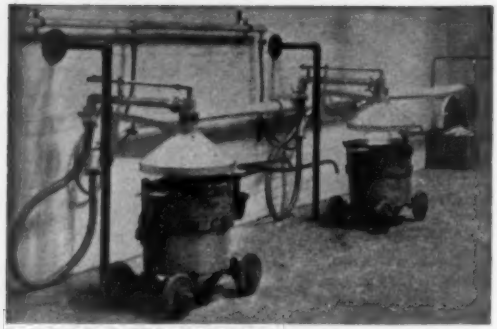

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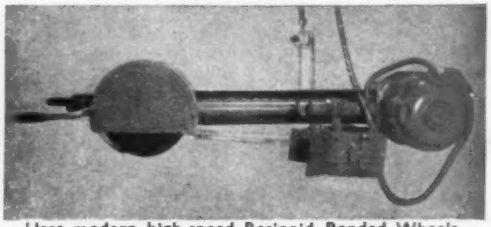

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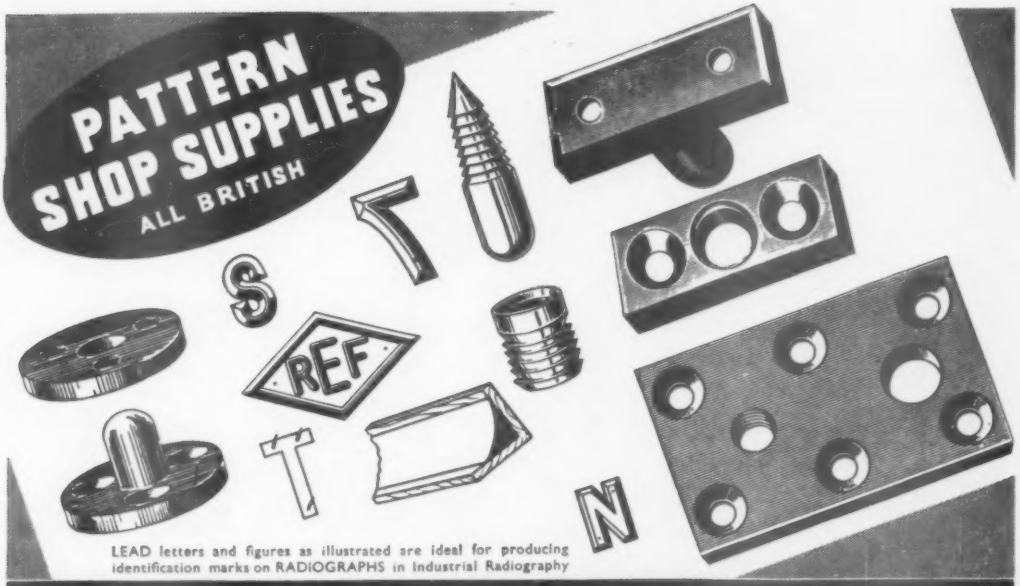

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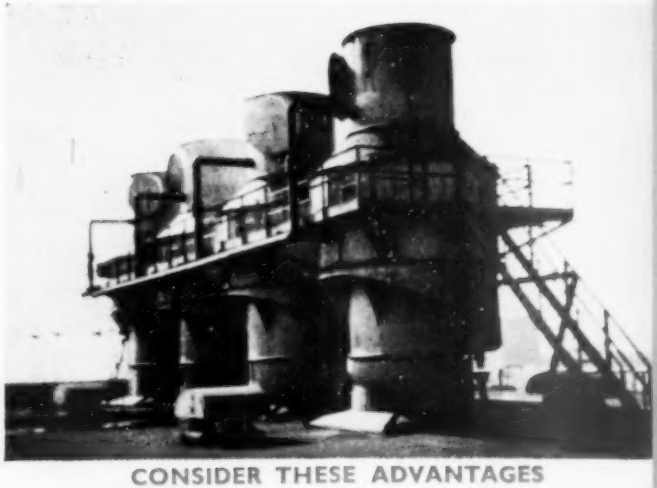

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